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(54) **AUTOMATED DEVICE FOR PHYSICAL OUTPUT WITHDRAW**

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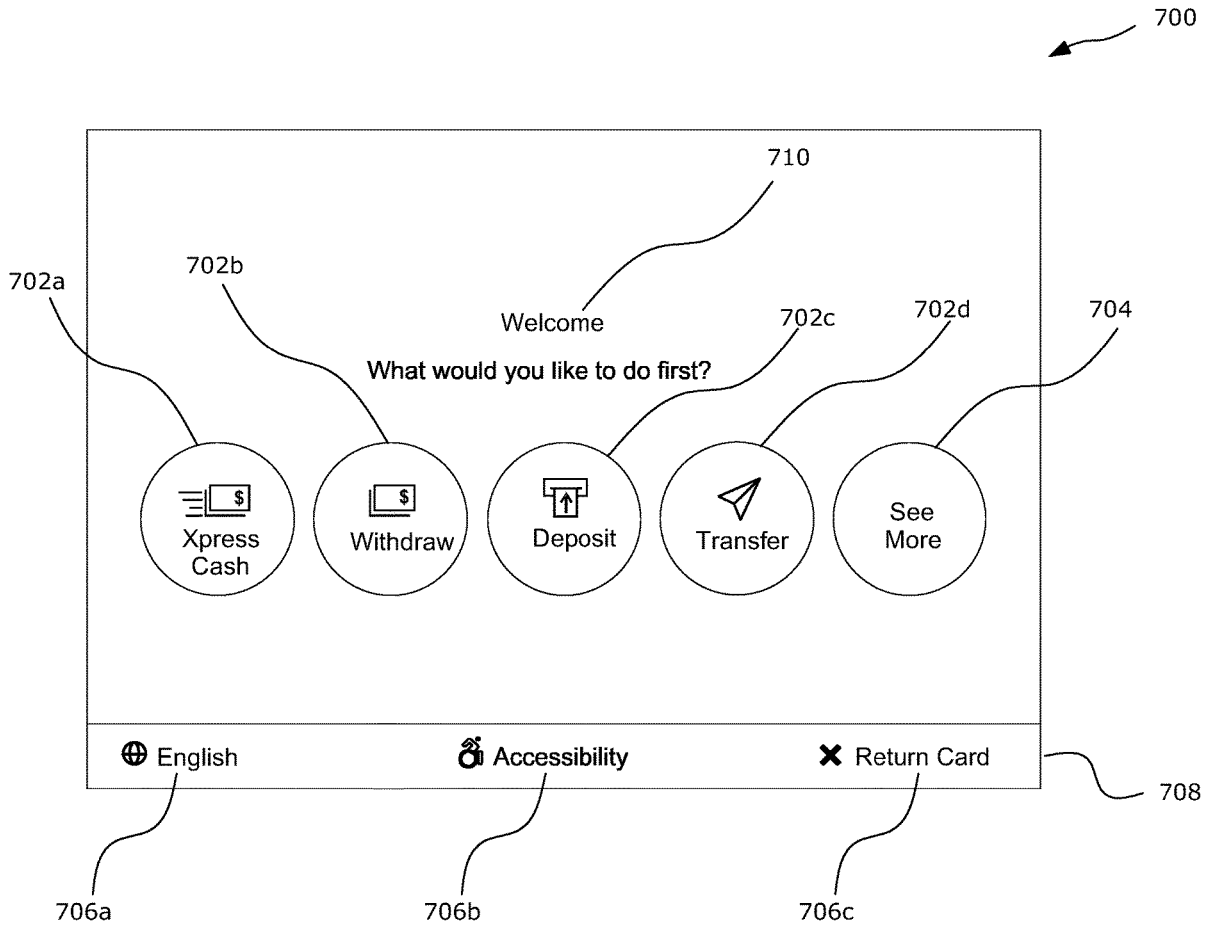
(57) **ABSTRACT**

Methods and systems for providing physical output at an automated device are described. An automated device provides a sequence of interfaces. The automated device communicates with a server to exchange data, which is used to dynamically populate one or more of the interfaces in the sequence. The interface sequences includes: a data value selection interface for receiving a data value used to request physical output from the automated device; format selection interface for selecting a format of the physical output; a data update processing interface indicating processing; an acknowledgement interface indicating that the account was updated and the physical output has been provided; and a record preview interface providing a preview of a session record.



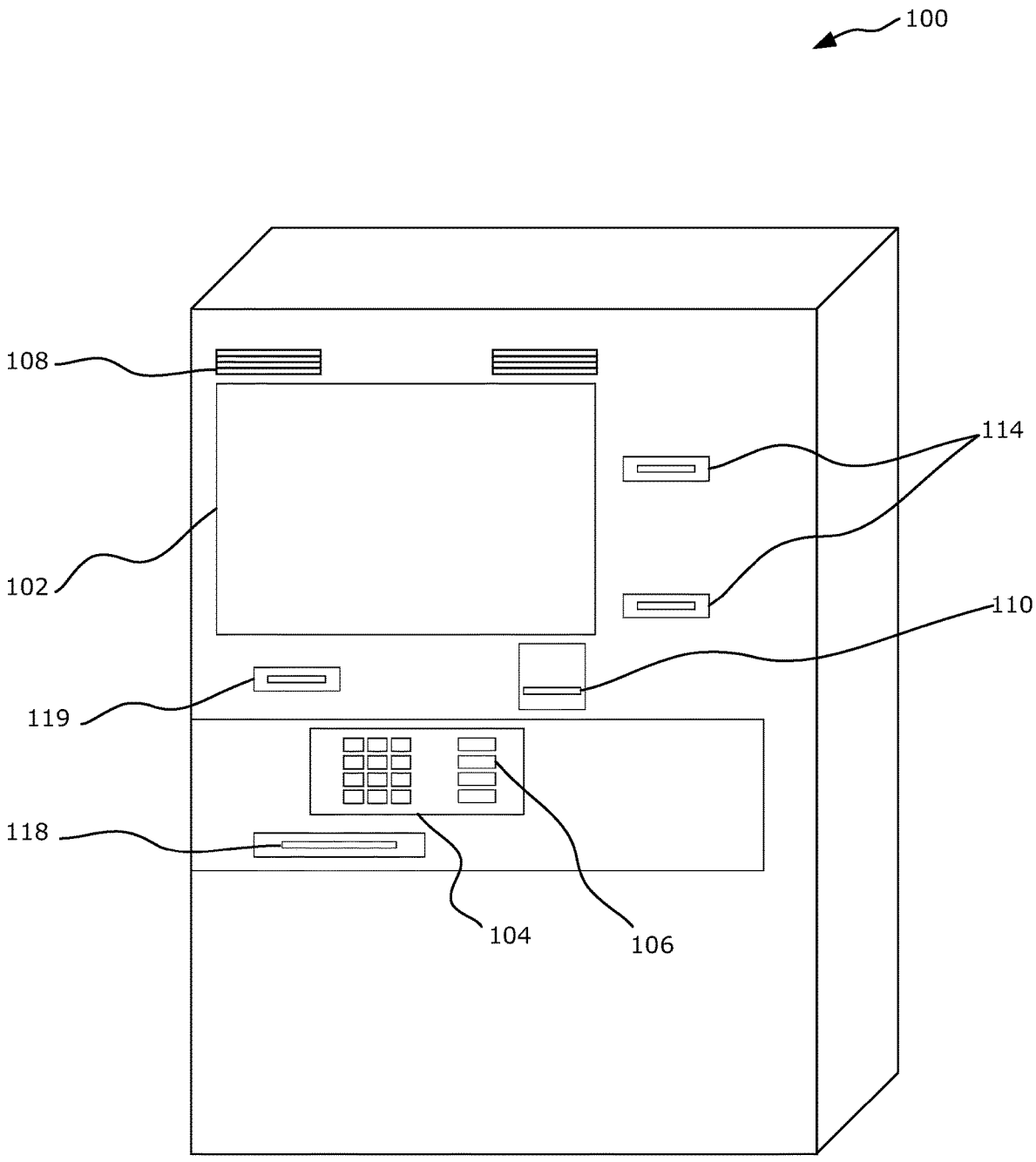


FIG. 1

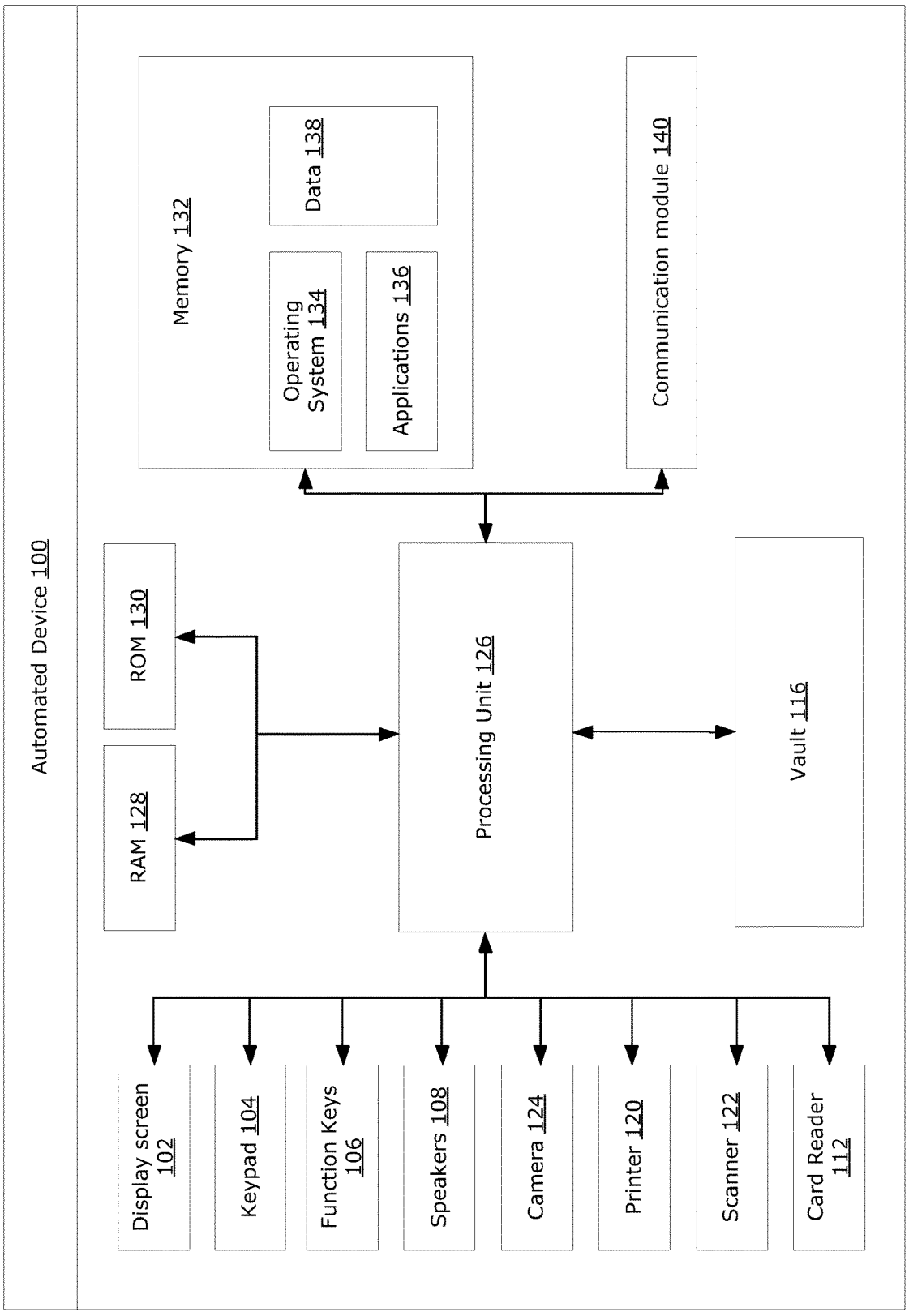

Automated Device 100
Memory 132
Data 138
Operating System 134
Applications 136
Communication module 140
ROM 130
RAM 128
Processing Unit 126
Vault 116
Display screen 102
Keypad 104
Function Keys 106
Speakers 108
Camera 124
Printer 120
Scanner 122
Card Reader 112

FIG. 2

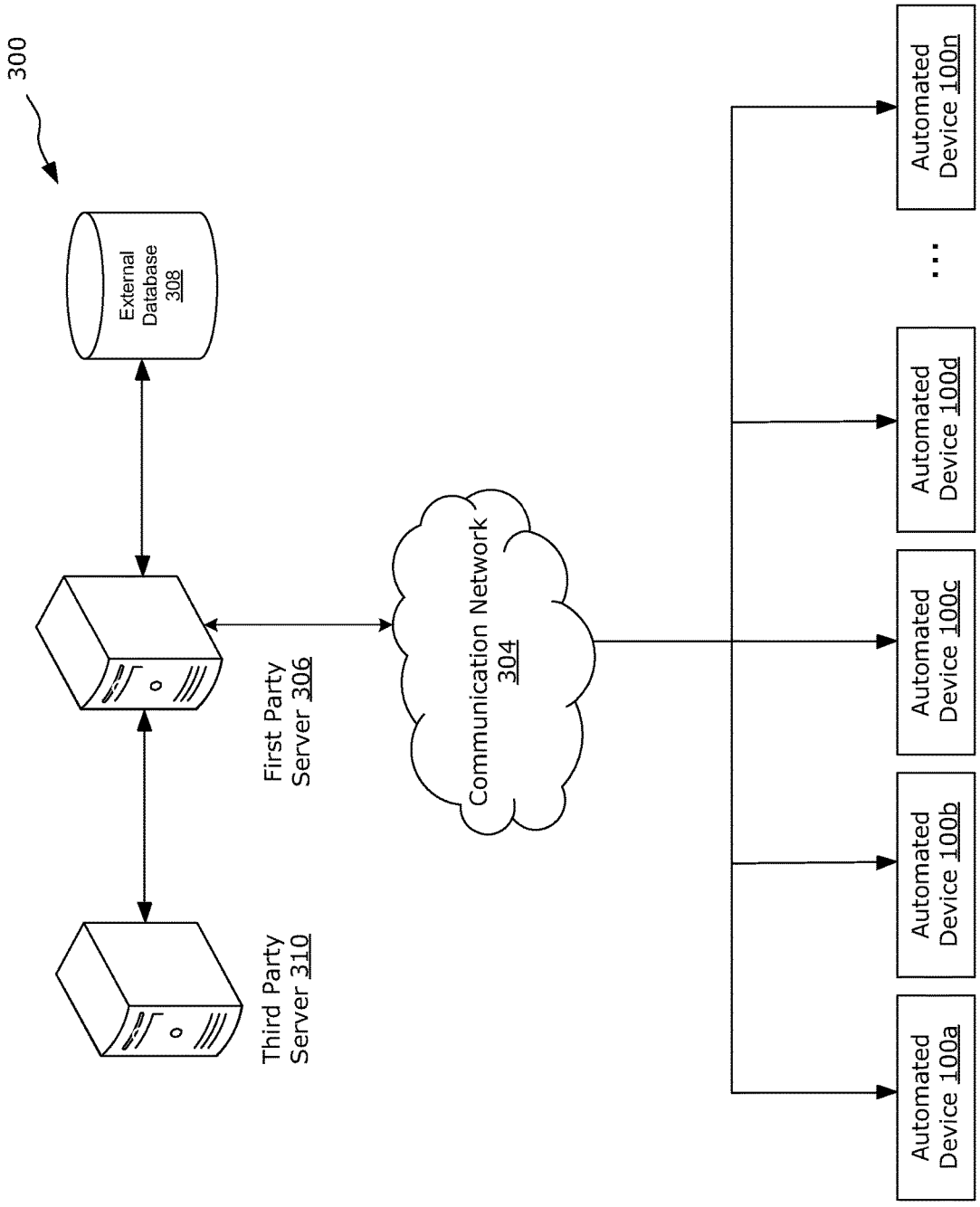

300
External Database 308
First Party Server 306
Third Party Server 310
Communication Network 304
Automated Device 100a
Automated Device 100b
Automated Device 100c
Automated Device 100d
...
Automated Device 100n

FIG. 3

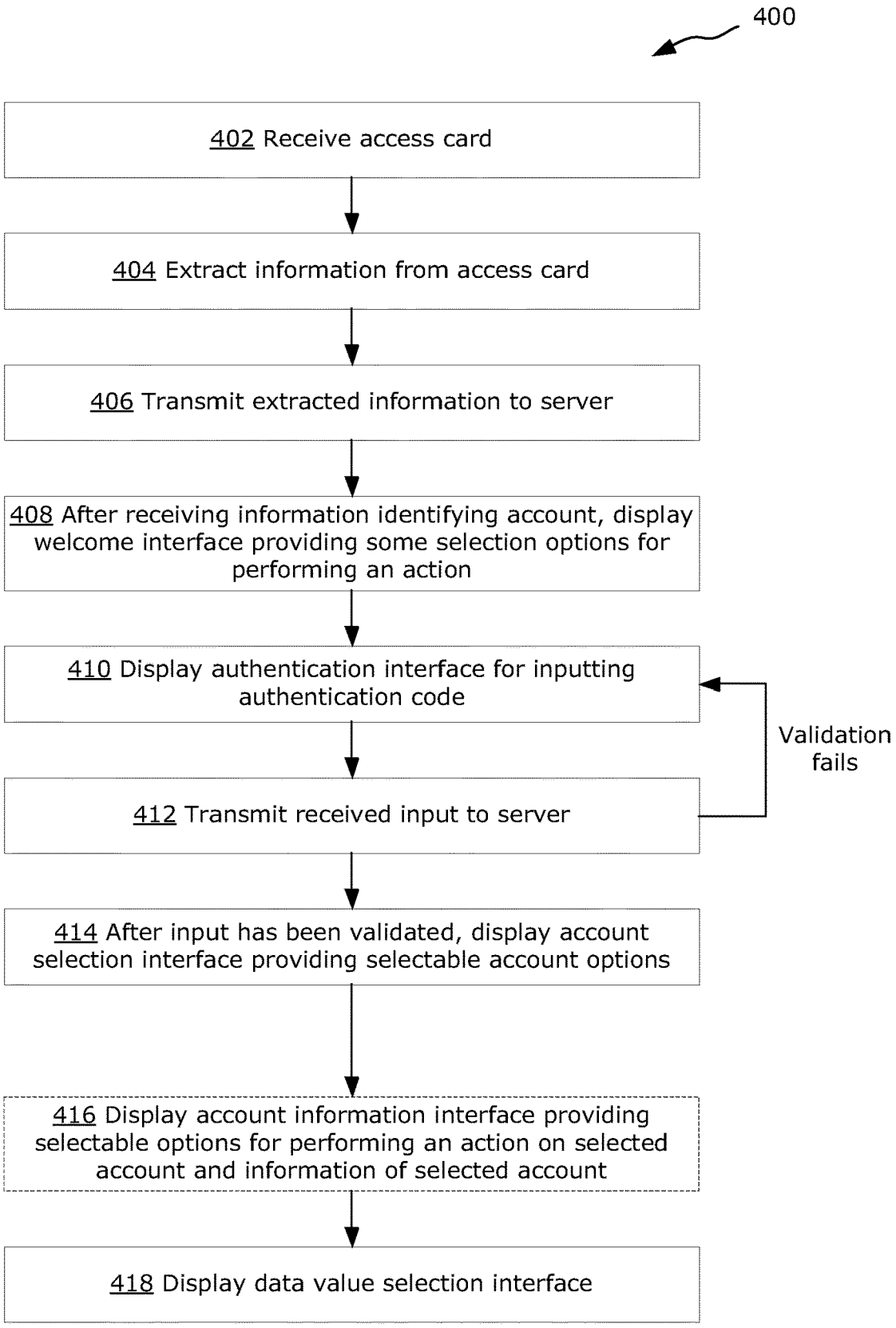

400
402 Receive access card
404 Extract information from access card
406 Transmit extracted information to server
408 After receiving information identifying account, display welcome interface providing some selection options for performing an action
410 Display authentication interface for inputting authentication code
412 Transmit received input to server
Validation fails
414 After input has been validated, display account selection interface providing selectable account options
416 Display account information interface providing selectable options for performing an action on selected account and information of selected account
418 Display data value selection interface

FIG. 4

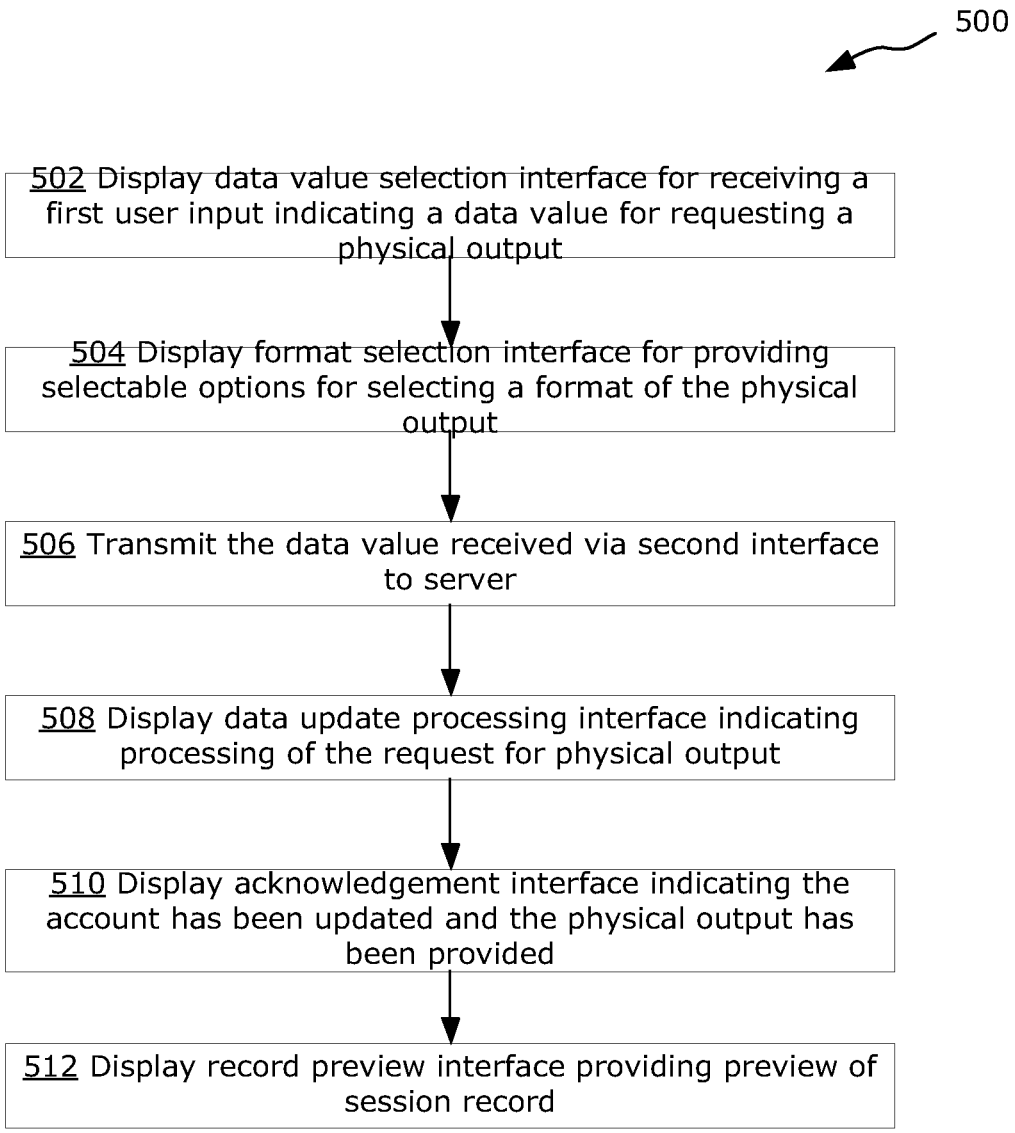

500
502 Display data value selection interface for receiving a first user input indicating a data value for requesting a physical output
504 Display format selection interface for providing selectable options for selecting a format of the physical output
506 Transmit the data value received via second interface to server
508 Display data update processing interface indicating processing of the request for physical output
510 Display acknowledgement interface indicating the account has been updated and the physical output has been provided
512 Display record preview interface providing preview of session record

FIG. 5

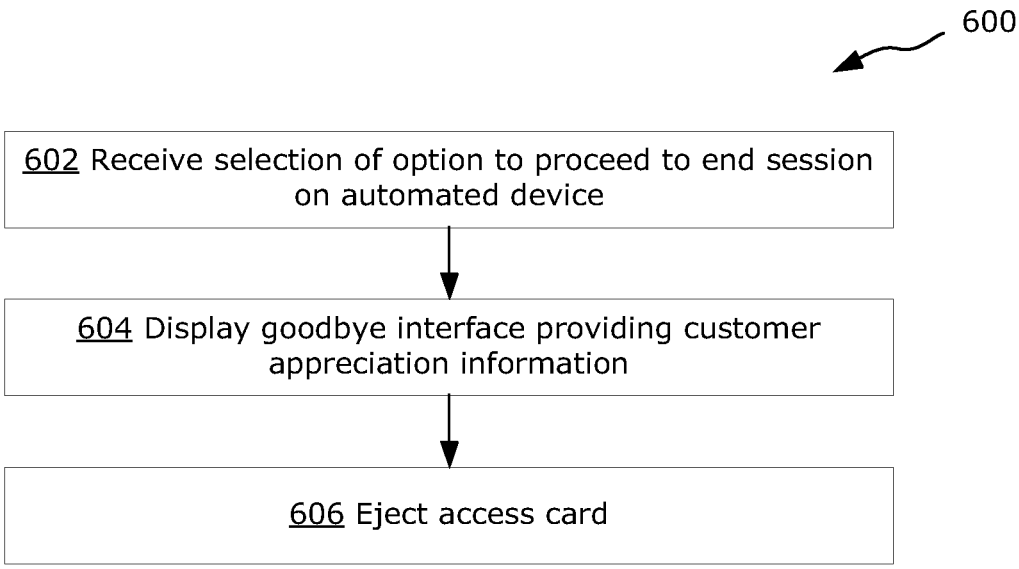

600
602 Receive selection of option to proceed to end session on automated device
604 Display goodbye interface providing customer appreciation information
606 Eject access card

FIG. 6

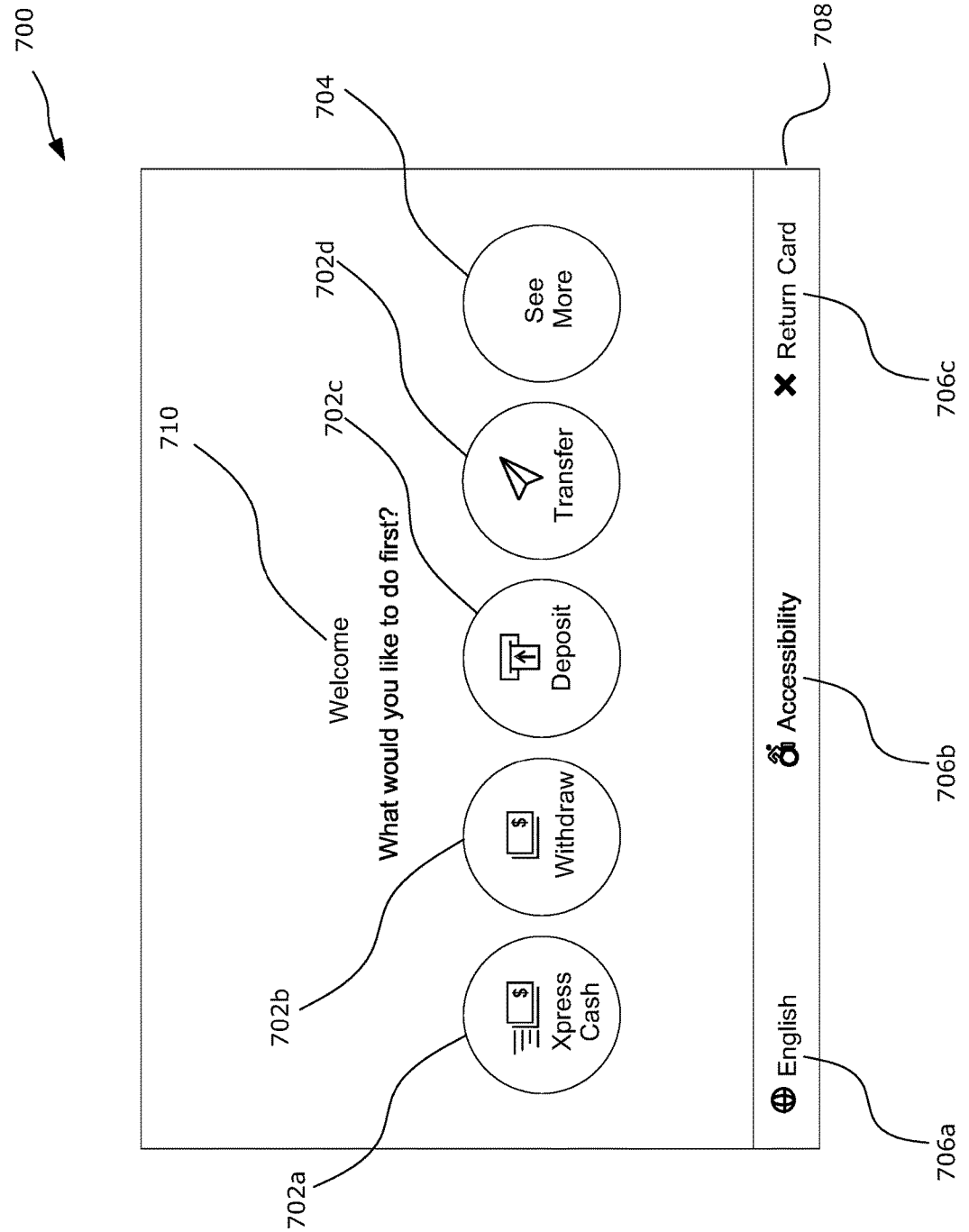

700
704
708
710
Welcome
What would you like to do first?
702b
702c
702d
Xpress Cash
Withdraw
Deposit
Transfer
See More
English
Accessibility
Return Card
706a
706b
706c
702a

FIG. 7

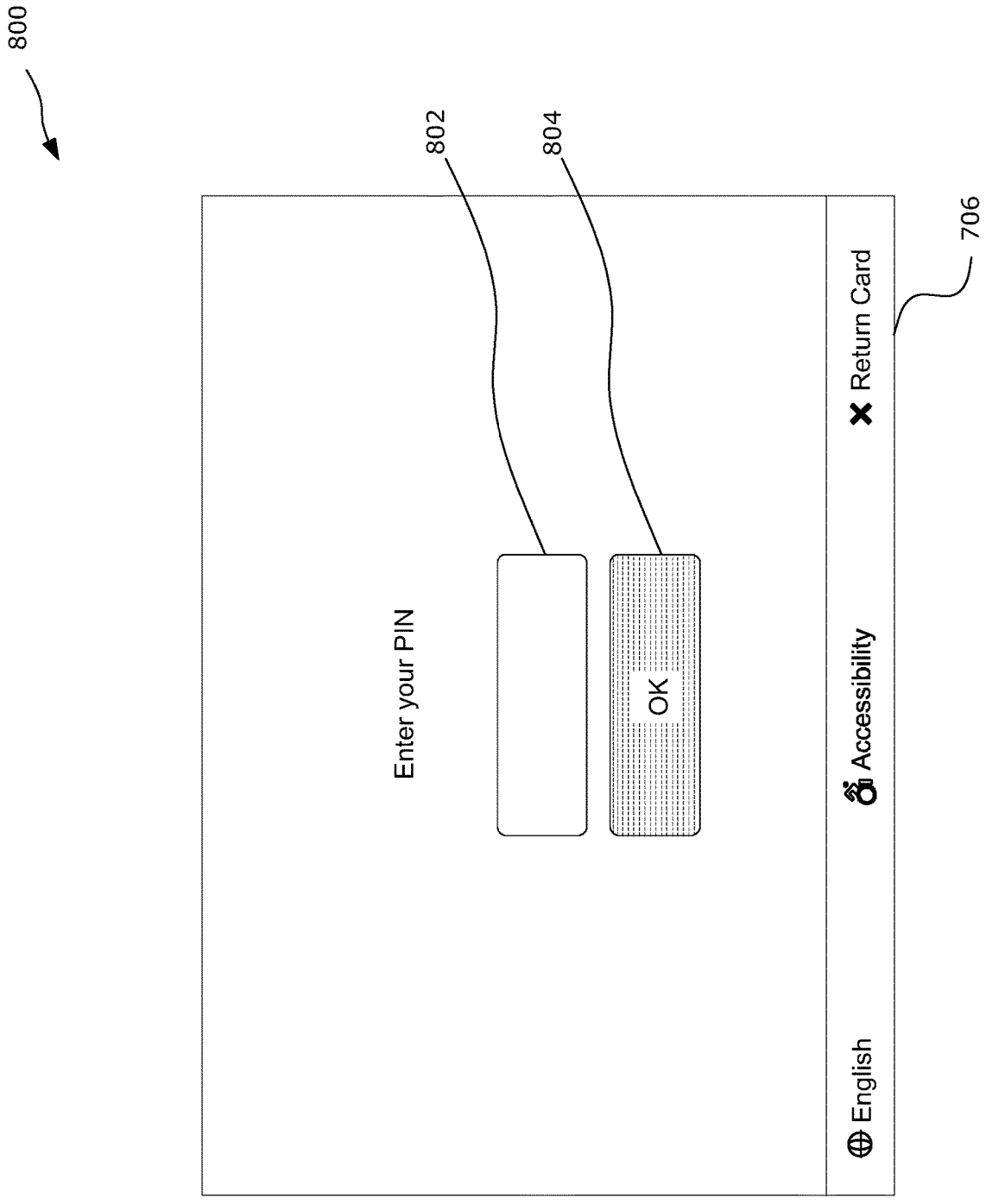

800
802
804
706
Enter your PIN
OK
Return Card
Accessibility
English

FIG. 8

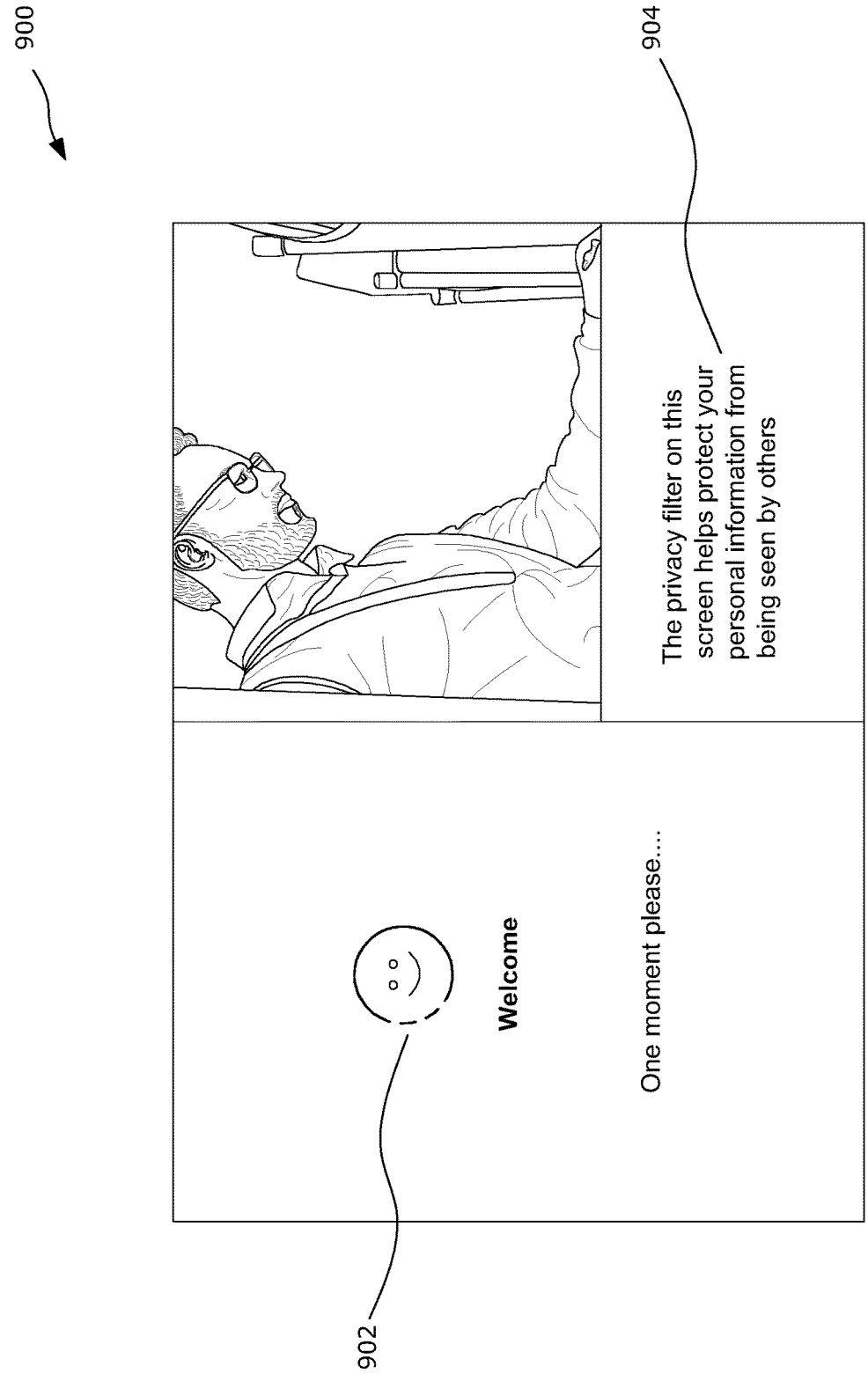

900
904
The privacy filter on this screen helps protect your personal information from being seen by others
Welcome
One moment please....
902

FIG. 9

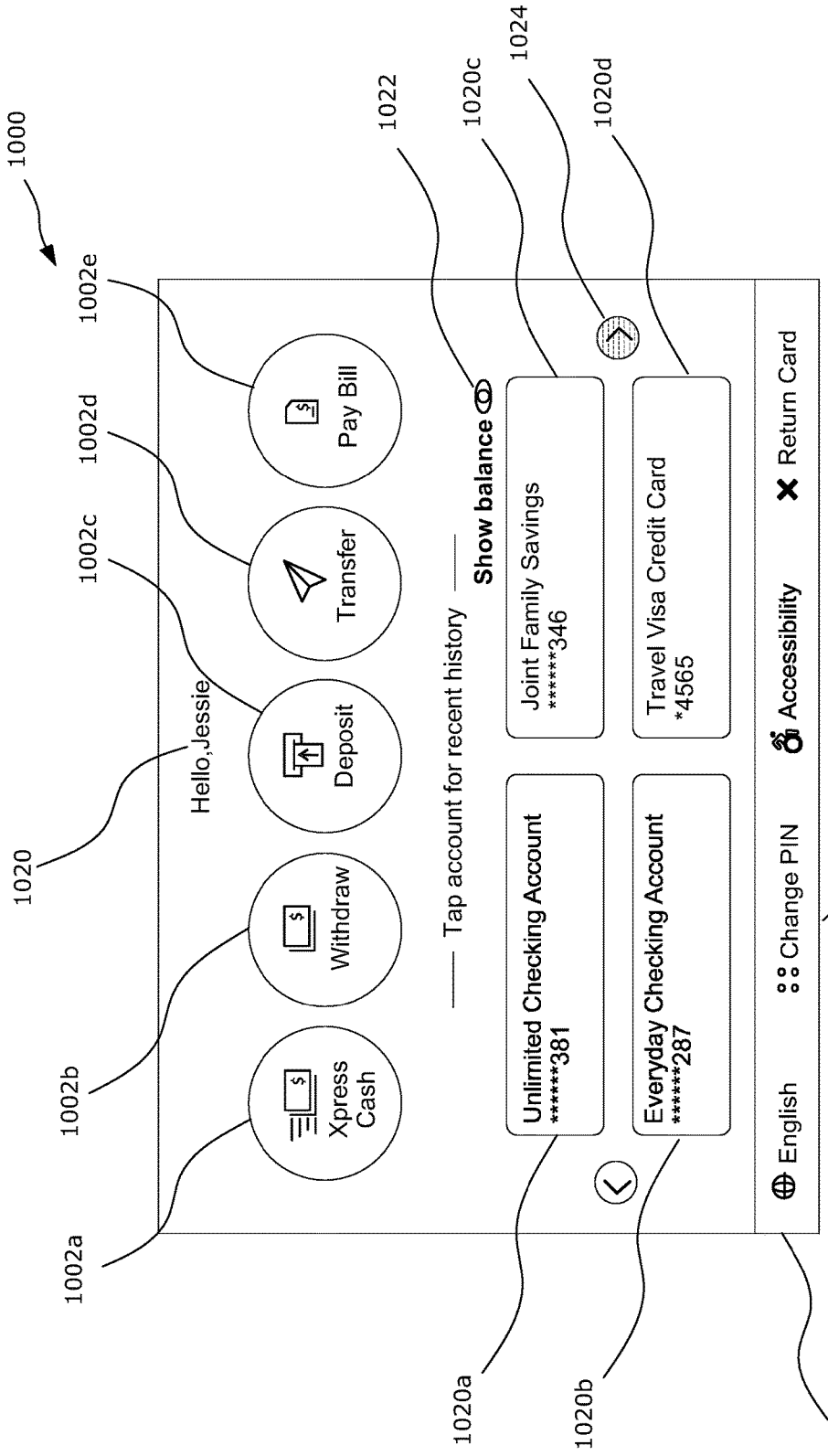

1000
1002e
1002d
1002c
1002b
1002a
1020
1022
1020c
1024
1020d
Hello, Jessie
Xpress Cash
Withdraw
Deposit
Transfer
Pay Bill
Tap account for recent history
Show balance
Unlimited Checking Account
******381
Joint Family Savings
******346
Everyday Checking Account
******287
Travel Visa Credit Card
*4565
English
Change PIN
Accessibility
Return Card
1020a
1020b
706
1002f

FIG. 10A

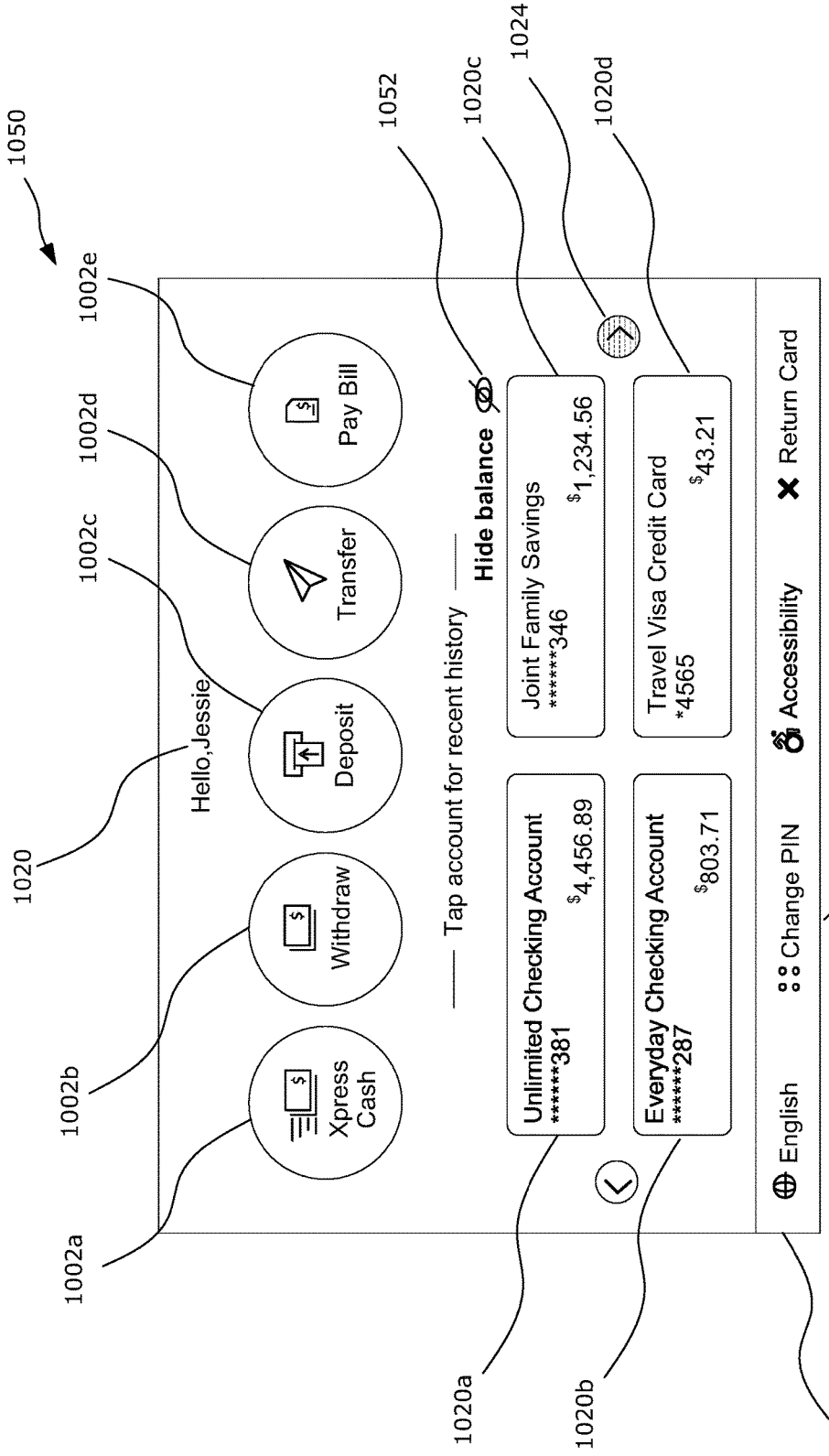

1050
1020
Hello, Jessie
1002a
1002b
1002c
1002d
1002e
Xpress Cash
Withdraw
Deposit
Transfer
Pay Bill
1052
Tap account for recent history
Hide balance
1020c
1024
1020d
Joint Family Savings
******346
$1,234.56
Travel Visa Credit Card
*4565
$43.21
Unlimited Checking Account
******381
$4,456.89
Everyday Checking Account
******287
$803.71
1020a
1020b
English
Change PIN
Accessibility
Return Card
706
1002f

FIG. 10B

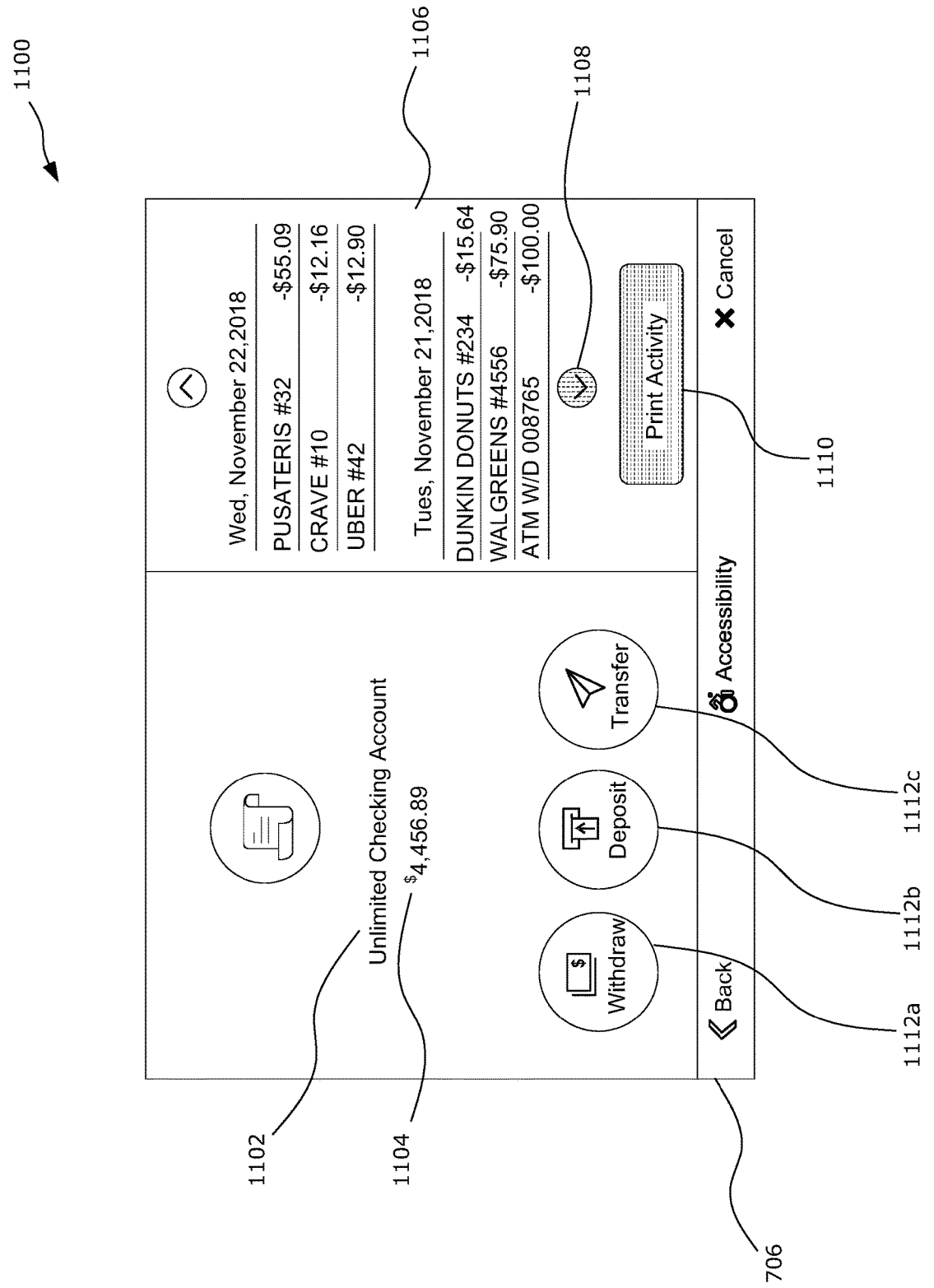

1100
1106
1108
Wed, November 22,2018
PUSATERIS #32 -$55.09
CRAVE #10 -$12.16
UBER #42 -$12.90
Tues, November 21,2018
DUNKIN DONUTS #234 -$15.64
WALGREENS #4556 -$75.90
ATM W/D 008765 -$100.00
Print Activity
1110
Cancel
Accessibility
Transfer
Deposit
Withdraw
Back
Unlimited Checking Account
$4,456.89
1102
1104
1112a
1112b
1112c
706

FIG. 11

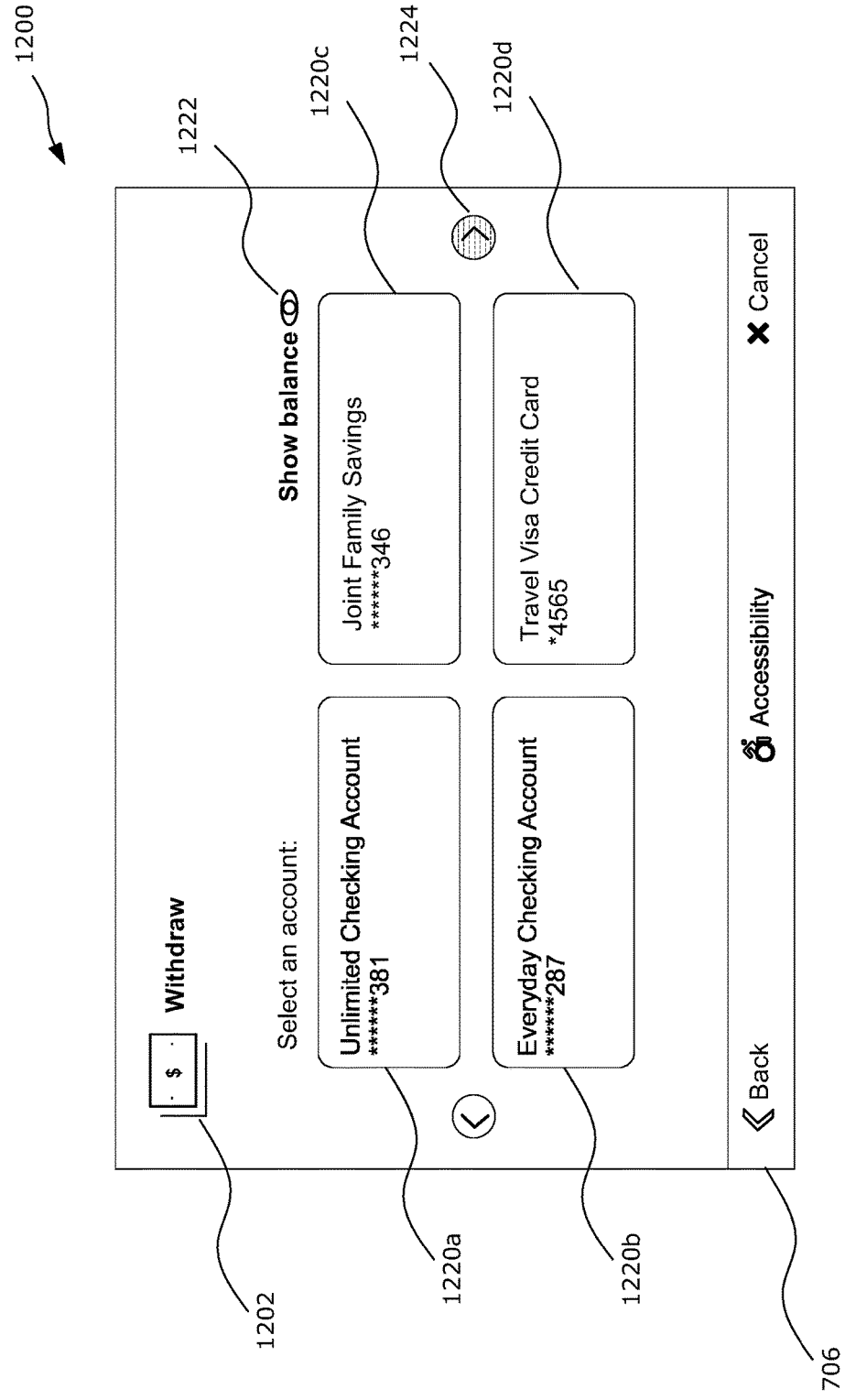

1200
1222
1220c
1224
1220d
Withdraw
Show balance
Select an account:
Unlimited Checking Account
******381
Joint Family Savings
******346
Everyday Checking Account
******287
Travel Visa Credit Card
*4565
Back
Accessibility
Cancel
1202
1220a
1220b
706

FIG. 12A

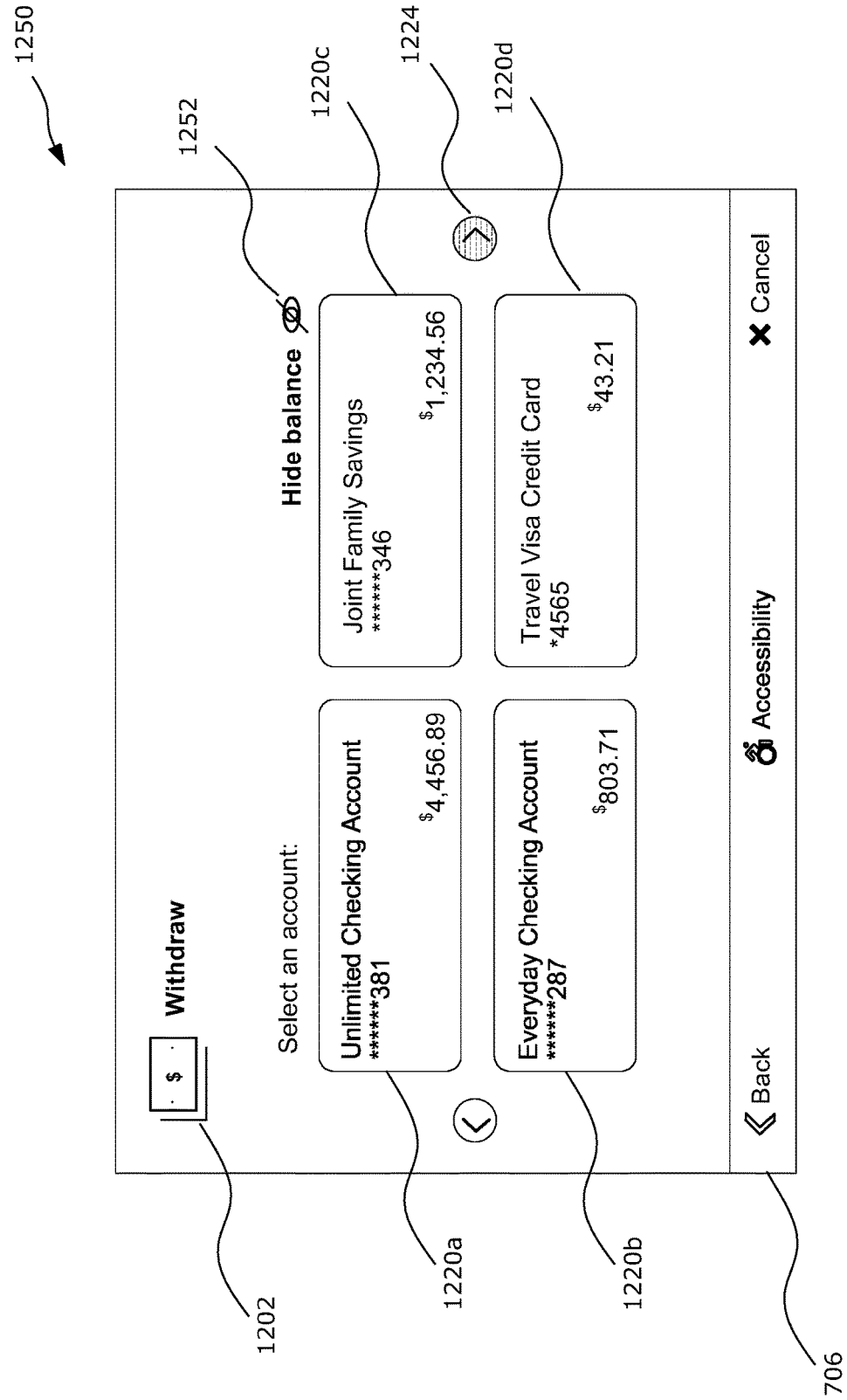

1250
1252
1220c
1224
1220d
Withdraw
Hide balance
Select an account:
Joint Family Savings
******346
$1,234.56
Unlimited Checking Account
******381
$4,456.89
Travel Visa Credit Card
*4565
$43.21
Everyday Checking Account
******287
$803.71
Back
Accessibility
Cancel
1202
1220a
1220b
706

FIG. 12B

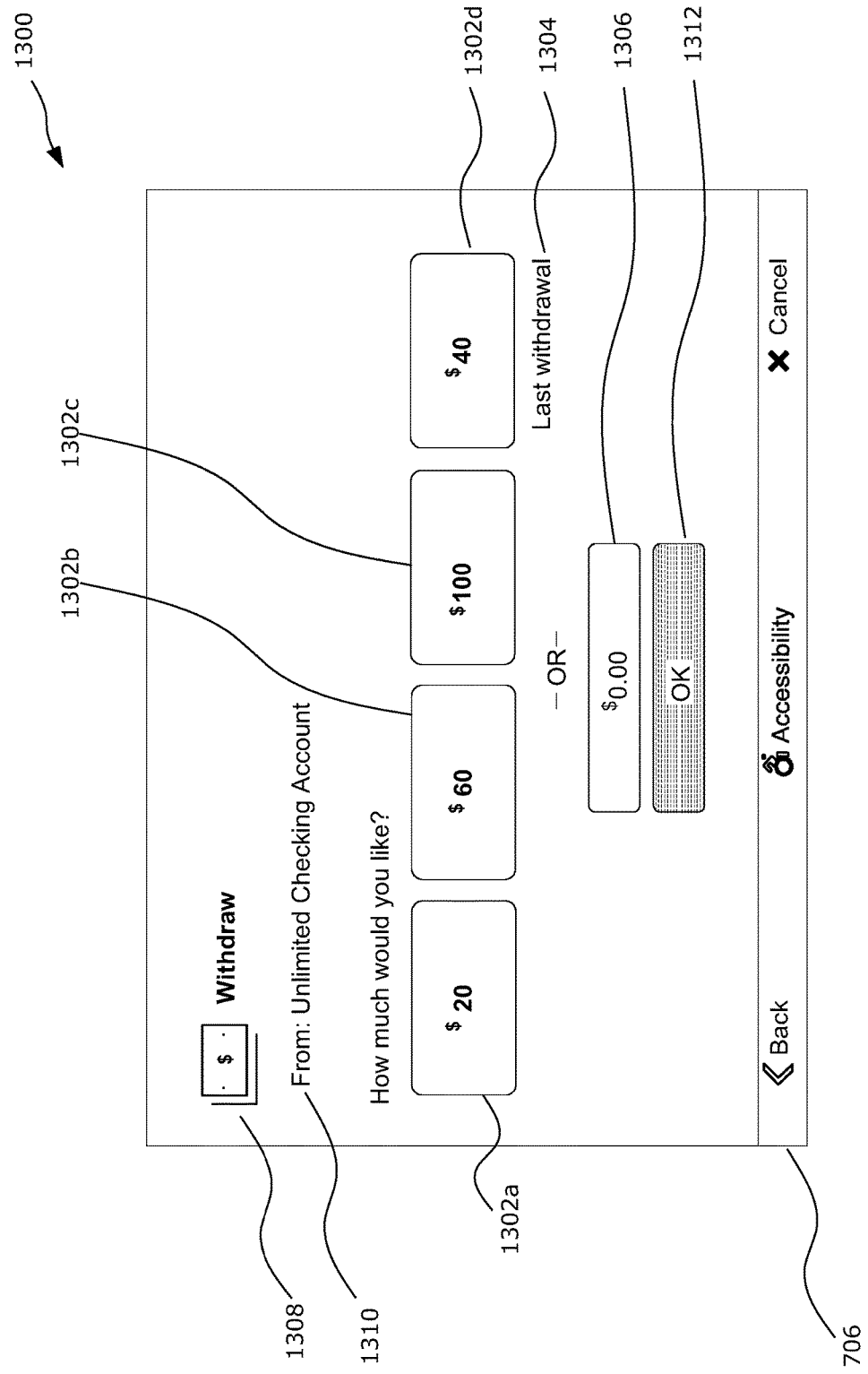

1300
1302d
1304
1306
1312
1302c
1302b
Withdraw
From: Unlimited Checking Account
How much would you like?
$ 20
$ 60
$100
$40
Last withdrawal
—OR—
$0.00
OK
Back
Accessibility
Cancel
1308
1310
1302a
706

FIG. 13

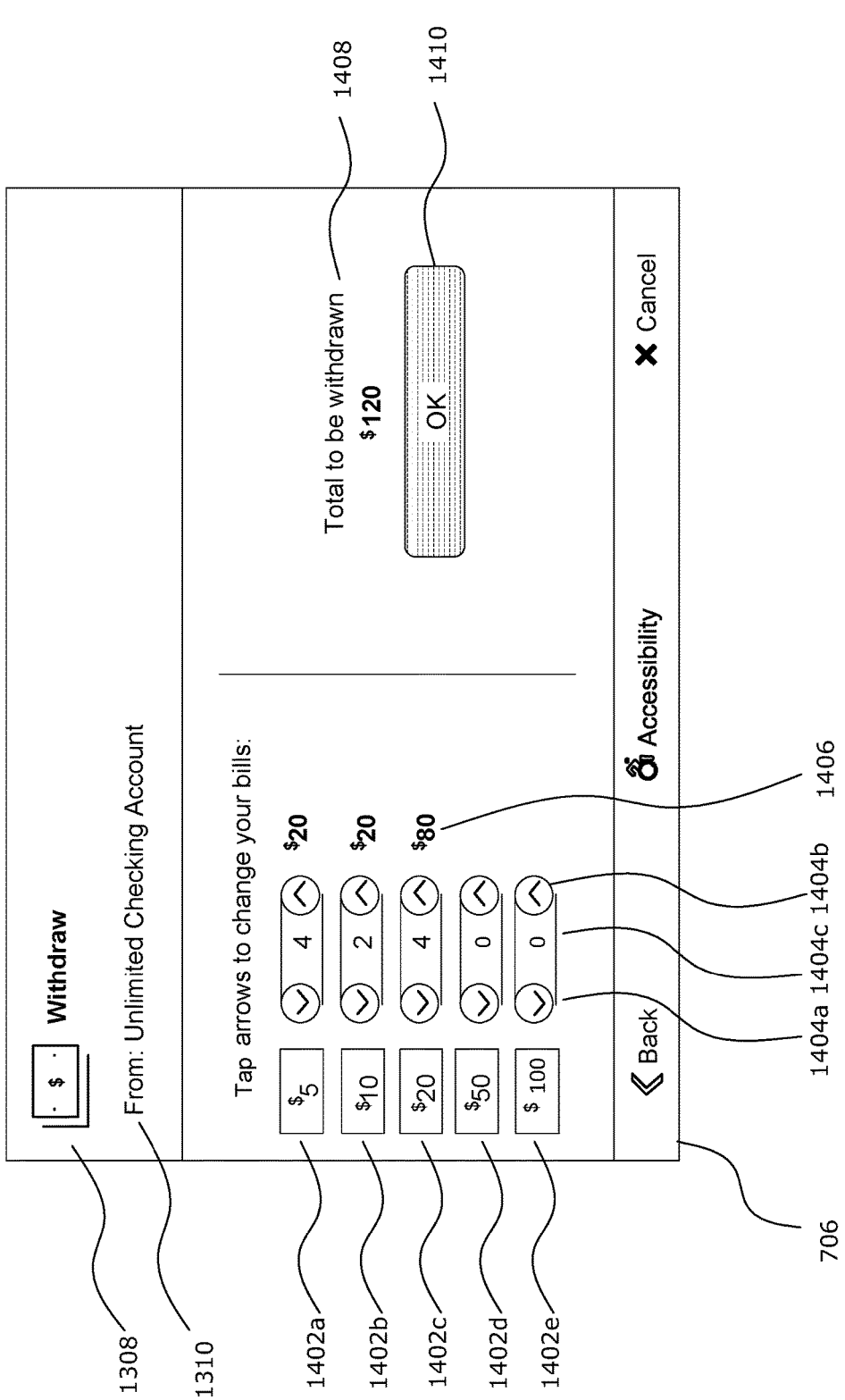

1400
Withdraw
From: Unlimited Checking Account
Tap arrows to change your bills:
$5
$10
$20
$50
$ 100
4
2
4
0
0
$20
$20
$80
Total to be withdrawn
$120
OK
Accessibility
Cancel
Back
1308
1310
1402a
1402b
1402c
1402d
1402e
1404a
1404c
1404b
1406
1408
1410
706

FIG. 14

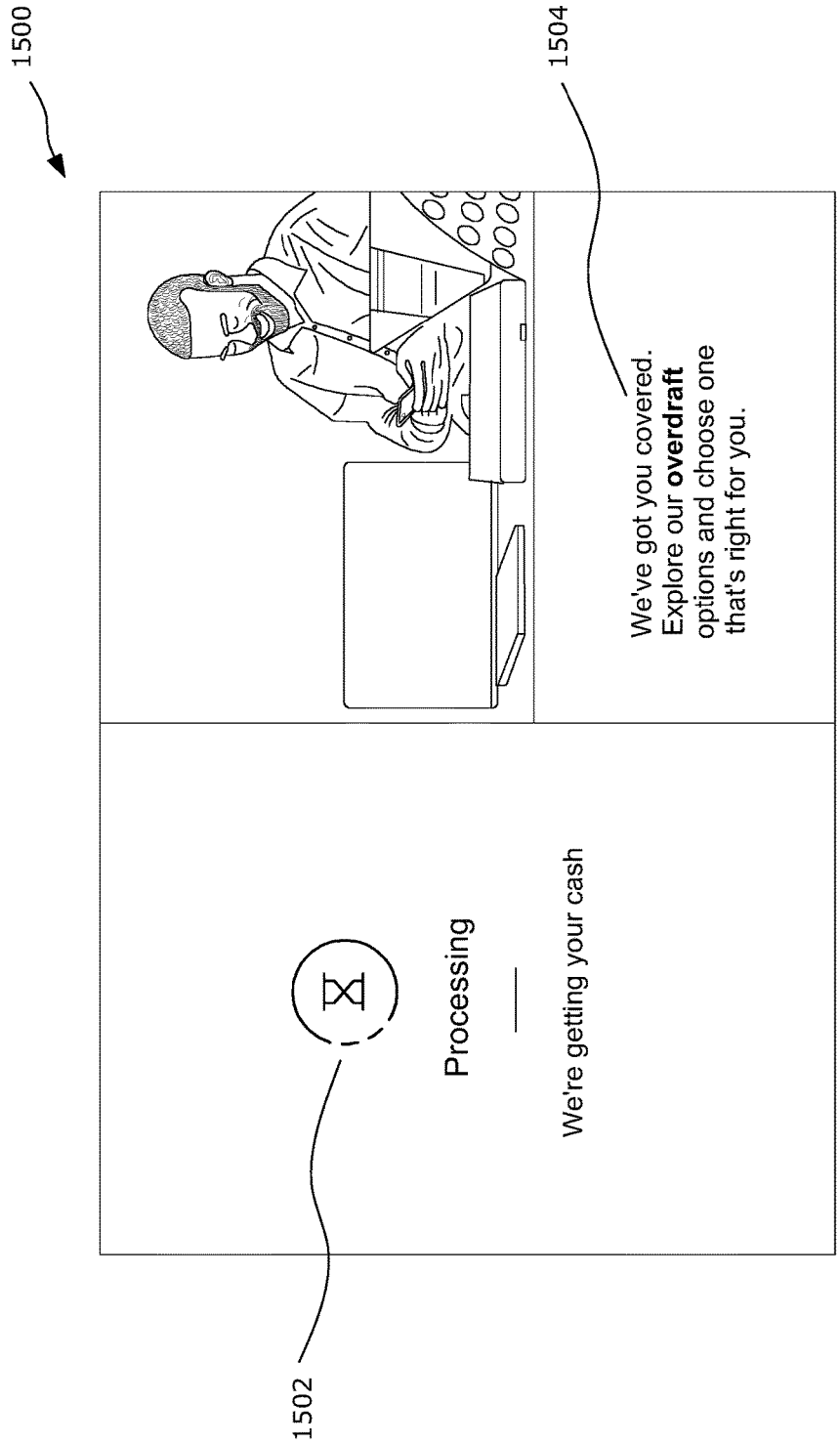

1500
1504
We've got you covered.
Explore our **overdraft**
options and choose one
that's right for you.
Processing
We're getting your cash
1502

FIG. 15

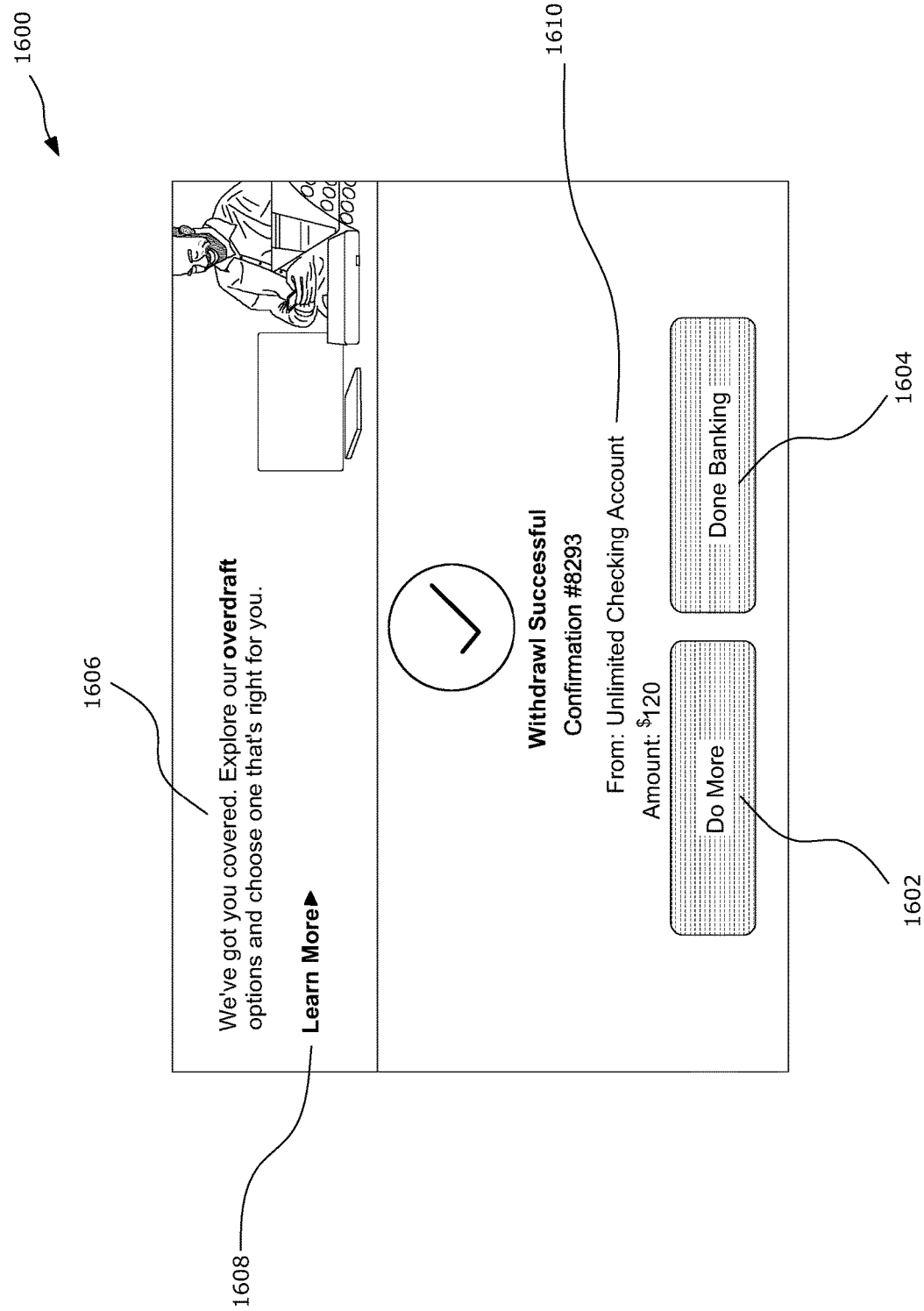

1600
1610
1606
1608
1602
1604
We've got you covered. Explore our **overdraft** options and choose one that's right for you.
Learn More▶
Withdrawl Successful
Confirmation #8293
From: Unlimited Checking Account
Amount: $120
Do More
Done Banking

FIG. 16

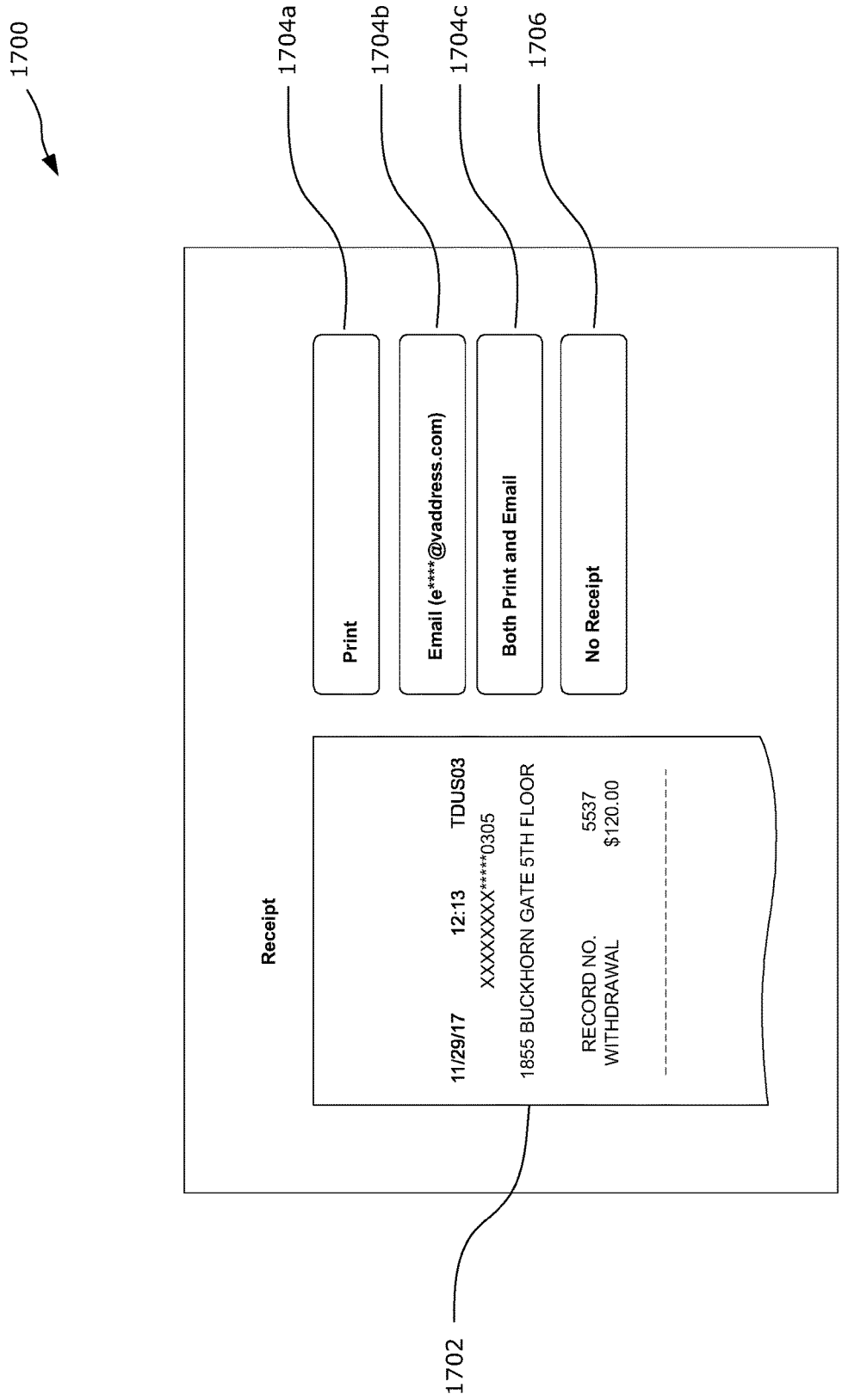

1700
1704a
1704b
1704c
1706
Print
Email (e****@vaddress.com)
Both Print and Email
No Receipt
Receipt
11/29/17 12:13 TDUS03
XXXXXXXX****0305
1855 BUCKHORN GATE 5TH FLOOR
RECORD NO. 5537
WITHDRAWAL $120.00
1702

FIG. 17

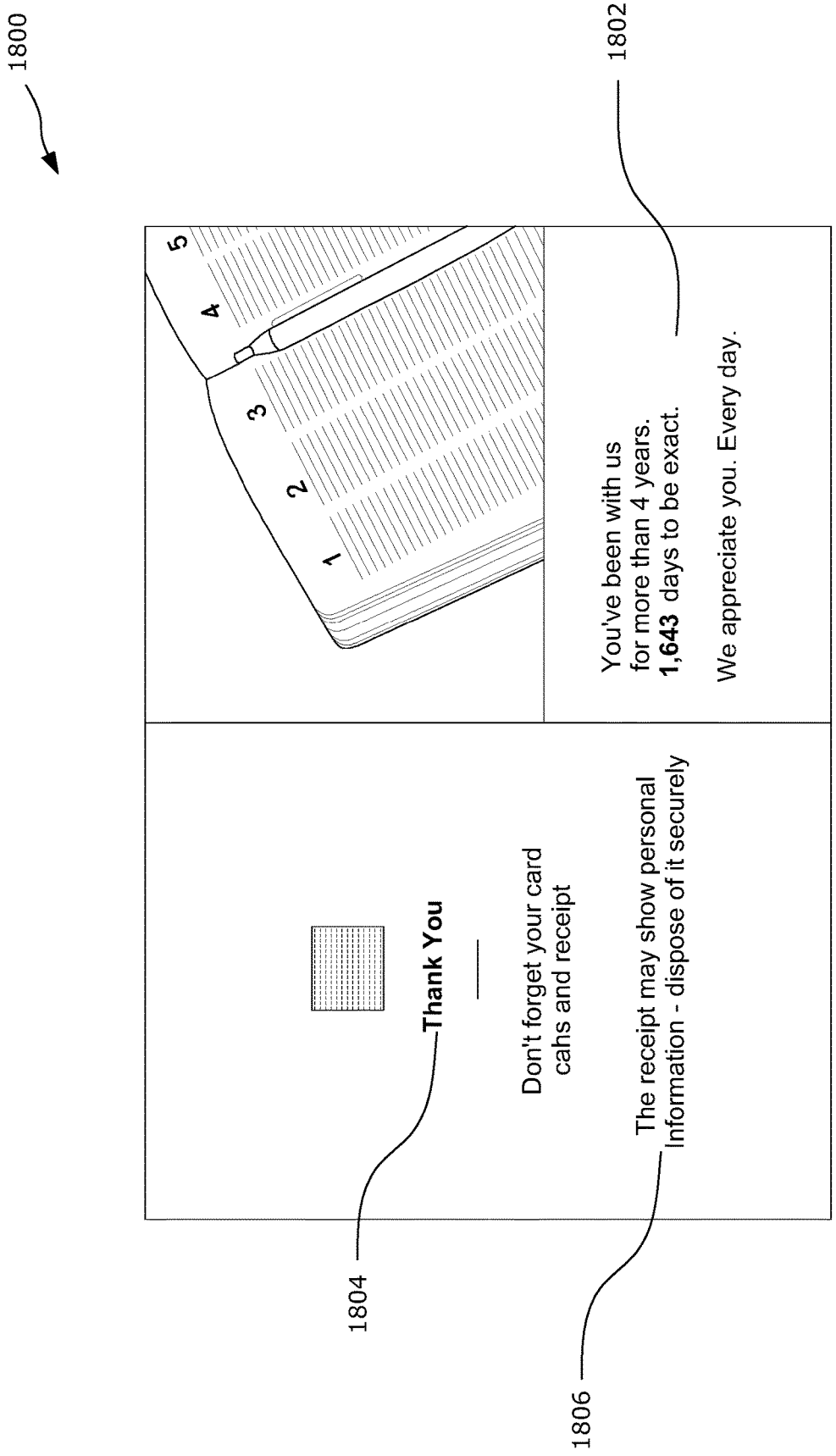

1800
1802
1804
1806
1
2
3
4
5
You've been with us
for more than 4 years.
1,643 days to be exact.
We appreciate you. Every day.
Thank You
Don't forget your card
cahs and receipt
The receipt may show personal
Information - dispose of it securely

FIG. 18

AUTOMATED DEVICE FOR PHYSICAL OUTPUT WITHDRAW

FIELD

[0001] The present disclosure is related to an automated device providing an interface enabling exchange of data.

BACKGROUND

[0002] An automated device may enable a user to perform a variety of actions related to a user account. The automated device may enable exchange of data with a backend server that manages the user account, in order to update, output information about, or otherwise perform an action related to the user account. The automated device may provide a sequence of interfaces to enable the user to perform a selected action related to the user account. For example, the automated device may be an automated teller machine (ATM), which may provide a sequence of interfaces to enable the user to perform an action related to the user's account at a service provider such as a financial institution.

[0003] User interaction with such an automated device may be time-consuming and frustrating for a number of reasons. For example, a user may find it time-consuming when there are a high number of inputs required to complete a desired action, or a user may find it frustrating when there is too much or too little information provided during the interaction. Further, interactions with the automated device can be challenging and prone to errors for certain users, particularly seniors, users with disabilities, users with language comprehension challenges, and users who are uncomfortable with technology. Accordingly, there is a need for methods, devices and systems related to user interactions with automated devices.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] Reference will now be made, by way of example, to the accompanying drawings which show example embodiments of the present application, and in which:

[0005] FIG. **1** is a schematic diagram of an example automated device, in accordance with example embodiments of the present disclosure;

[0006] FIG. **2** is a block diagram showing some internal components of the automated device of FIG. **1**;

[0007] FIG. **3** is a schematic diagram of an example network environment in which example embodiments of the present disclosure may be implemented;

[0008] FIG. **4** is a flowchart illustrating an example method for initiating a session on an automated device;

[0009] FIG. **5** is a flowchart illustrating an example method for providing a physical output by the automated device;

[0010] FIG. **6** is a flowchart illustrating an example method for ending a session at an automated device;

[0011] FIG. **7** is an example welcome interface;

[0012] FIG. **8** is an example authentication interface;

[0013] FIG. **9** is an example authentication waiting interface;

[0014] FIG. **10**A is an example account selection interface that provides options for selecting an account;

[0015] FIG. **10**B is an example alternate account selection interface showing the current states of selectable accounts;

[0016] FIG. **11** is an example account information interface for providing information about a selected account;

[0017] FIG. **12**A is another example account selection interface that provides options for selecting an account, in the context of providing physical output;

[0018] FIG. **12**B is another example alternate account selection interface showing the current states of selectable accounts, in the context of providing physical output;

[0019] FIG. **13** is an example data value selection interface that provides options for receiving a data value used to request physical output from the automated device;

[0020] FIG. **14** is an example format selection interface for selecting a format of the physical output;

[0021] FIG. **15** is an example data update processing interface;

[0022] FIG. **16** is an example acknowledgement interface indicating the account has been updated and the physical output has been provided;

[0023] FIG. **17** is an example record preview interface for providing a preview of a record of the session and associated options; and

[0024] FIG. **18** is an example goodbye interface for providing customer appreciation information.

[0025] Similar reference numerals may have been used in different figures to denote similar components.

DESCRIPTION OF EXAMPLE EMBODIMENTS

[0026] The present disclosure is made with reference to the accompanying drawings, in which embodiments are shown. However, many different embodiments may be used, and thus the description should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete. Like numbers refer to like elements throughout. Separate boxes or illustrated separation of functional elements of illustrated systems and devices does not necessarily require physical separation of such functions, as communication between such elements may occur by way of messaging, function calls, shared memory space, and so on, without any such physical separation. As such, functions need not be implemented in physically or logically separated platforms, although they are illustrated separately for ease of explanation herein. Different devices may have different designs, such that although some devices implement some functions in fixed function hardware, other devices may implement such functions in a programmable processor with code obtained from a machine-readable medium. Elements referred to in the singular may be implemented in the plural and vice versa, except where indicated otherwise either explicitly or inherently by context. The term "directly" is used herein to mean automatically and without intervening operations.

[0027] In accordance with one aspect of the present disclosure, there is provided an automated device comprising: a display screen; a communication module for communication with a server; a processor coupled to the display screen and to the communication module; and a memory coupled to the processor, the memory having machine-executable instructions stored thereon, the instructions, when executed by the processor, causing the automated device to, during a session: display, on the display screen, a data value selection interface for receiving a first input indicating a data value for requesting physical output from the automated device, and providing an option to confirm the data value; directly in response to selection of the option to confirm the data value, display, on the display screen, a format selection interface

providing an option to select a format of the physical output, and providing an option to confirm the format of the physical output; directly in response to selection of the option to confirm the format of the physical output, transmit, via the communication module, a first signal to the server, the first signal including the data value received via the data value selection interface; display, on the display screen, a data update processing interface providing output indicating processing of the request for the physical output; directly in response to receipt of a second signal from the server, via the communication module, indicating that the data associated with an account has been updated with the data value, display, on the display screen, an acknowledgement interface indicating the account has been updated and indicating that the physical output has been provided, the acknowledgement interface further providing an option to end the session and an option to continue the session; directly in response to selection of the option to end the session, display, on the display screen, a record preview interface providing a preview of a record of the session, the record preview interface further providing an option to generate output of the record.

[0028] In accordance with another aspect of the present disclosure, there is provided a method at an automated device. The method includes: displaying, during a session, a data value selection interface for receiving a first input indicating a data value for requesting physical output from the automated device, and providing an option to confirm the data value; directly in response to selection of the option to confirm the data value, displaying a format selection interface providing an option to select a format of the physical output, and providing an option to confirm the format of the physical output; directly in response to selection of the option to confirm the format of the physical output, transmitting a first signal to a server to update data associated with an account managed by the server, the first signal including the data value received via the data value selection interface; displaying a data update processing interface providing output indicating processing of the physical output; directly in response to receipt of a second signal from the server, indicating that the data associated with an account has been updated with the data value, displaying an acknowledgement interface indicating the account has been updated and indicating that the physical output has been provided, the acknowledgement interface further providing an option to end the session and an option to continue the session; directly in response to selection of the option to end the session, displaying a record preview interface providing a preview of a record of the session, the record preview interface further providing an option to generate output of the record.

[0029] In accordance with another aspect of the present disclosure, there is provided A non-transitory machine-readable medium having tangibly stored thereon executable instructions for execution by a processor of an automated device, wherein the instructions, when executed by the processor, cause the automated device to, during a session: display, on a display screen of the automated device, a data value selection interface for receiving a first input indicating a data value for requesting physical output from the automated device, and providing an option to confirm the data value; directly in response to selection of the option to confirm the data value, display, on the display screen, a format selection interface providing an option to select a format of the physical output, and providing an option to confirm the format of the physical output; directly in response to selection of the option to confirm the format of the physical output, a first signal to a server to update data associated with an account managed by the server, the first signal including the data value received via the data value selection interface; display, on the display screen, a data update processing interface providing output indicating processing of the physical output; directly in response to receipt of a second signal from the server, via the communication module, indicating that the data associated with an account has been updated with the first input data, display, on the display screen, a acknowledgement interface indicating the account has been updated and indicating that the physical output has been provided, the acknowledgement interface further providing an option to end the session and an option to continue the session; directly in response to selection of the option to end the session, display, on the display screen, a record preview interface providing a preview of a record of the session, the record preview interface further providing an option to generate output of the record.

[0030] In any of the above, the option to generate output of the record may include an option to transmit the output of the record to an email address linked to the account, wherein a third signal may be received from the backend server, via the communication module, the third signal including the email address, and wherein the option to transmit the output of the record to the email address may include a preview of the email address.

[0031] Any of the above may include steps or instructions to, directly in response the to the selection of an option on the record preview interface, display, on the display screen, a goodbye interface, the goodbye interface providing non-sensitive customer appreciation information specific to the account.

[0032] In any of the above, the data value selection interface may provide a selectable option for requesting a pre-defined value, and wherein the first input is selection of the option for requesting the pre-defined value, which sets the data value of the first input to be the selected pre-defined value.

[0033] In any of the above, the selectable option for requesting a pre-define value may comprise a historically selected data value.

[0034] In any of the above, the format selection interface may provide an option to select a default format of the physical output.

[0035] Any of the above may include steps or instructions to: extract information from an access card inserted into the automated device; transmit a fourth signal to the server, via the communication module, the fourth signal including the information extracted from the access card; in response to receipt of a fifth signal from the server, via the communication module, the fifth signal providing information identifying the account associated with the access card, display, on the display screen, an welcome interface, the welcome interface providing at least some of the plurality of selectable options for performing an action related to the account; directly in response to selection of one of the selectable options provided by the welcome interface, display, on the display screen, an authentication interface for inputting an authentication code for the account; transmit a sixth signal to the server, via the communication module, the sixth signal including a second input received via the authentication

interface; and display, on the display screen, a authentication waiting interface, the authentication waiting interface providing output indicating processing of the authentication code for the account; in response to receipt of a seventh signal from the server, via the communication module, the seventh signal providing information that the second input is validated for the account, display, on the display screen, an account selection interface, the account selection interface providing a selectable account option; and in response to selection of the selectable account option, proceed to display the data value selection interface.

[0036] Any of the above may include steps or instructions to, when the option selected at the welcome interface is an option to request the physical output, display, on the display screen, the data value selection interface directly in response to selection of the selectable account option at the account selection interface, and wherein the account to be updated is associated with the selected account option.

[0037] Any of the above may include steps or instructions to, when the option selected at the welcome interface is an option to display more selectable options: directly in response to selection of the selectable account option, display, on the display screen, an account information interface, the account information interface displaying information about an account associated with the selected account option, the account information interface providing selectable options for updating the account; and directly in response to selection of the selectable options for updating the account, display, on the display screen, the data value selection interface.

[0038] Any of the above may include steps or instructions to, directly in response to the selection, on the acknowledgement interface, of the option to continue the session, display, on the display screen, the account selection interface.

[0039] An automated device, also referred to in some examples as a self-service machine, may enable a user to perform certain actions, such as exchange of data or completion of transactions, without direct interaction with another human. Where the automated device is associated with or managed by a service provider, such as a financial institution, the automated device may provide services to clients of the service provider, as well as users who are not currently clients of the service provider, without direct interaction with a representative of the service provider. The automated device may enable a user to perform actions that involve an exchange of data with a backend server of the service provider. An automated device that is associated with a financial institution may provide certain financial services, and may also be referred to as an automated teller machine (ATM). ATMs may be used to perform actions such as dispense cash or other financial instruments for withdrawal, or accept financial instruments such as cash, money orders or checks for deposit. Other actions that may be performed at an ATM include, but are not limited to, credit card advances, inquiries, and payments, balance inquiries, payments and transfers, and the like. The user may also be able to manage a user's account associated with the service provider, such as changing an authentication code or other password for the account and/or selecting a language preference. The user may also be able to access and/or modify a user profile associated with the user account.

[0040] FIGS. **1** and **2** show an example automated device **100** that may be used to implement example embodiments of the present disclosure. The automated device **100** includes one or more input and/or output (I/O) devices that facilitate interaction between the user and the automated device **100**. As shown, a display screen **102** is provided which may be a touchscreen or non-touchscreen display. Where the display screen **102** is a touchscreen display, the display screen **102** may serve as both an input device as well as an output device. A graphical user interface (GUI) may be displayed on the display screen **102** to enable any suitable textual and/or graphical output/input.

[0041] The example automated device **100** includes a keypad **104** which may be used to provide input to the automated device **100**, for example to enter an authentication code (e.g., personal identification number (PIN)) and/or to provide numerical/non-numerical inputs. The keypad **104** may include keys for confirming/cancelling a particular action, and/or navigating through the interface provided by the automated device **100**. In some examples, the keypad **104** may include function keys **106** that may be used for specific input (e.g., "Accept", "Cancel"), in addition to multi-function or alphanumeric input keys. In some embodiments, the keypad **104** may be equipped with braille (or other forms of tactile indicators) to improve accessibility for visually impaired users. The automated device **100** may include audio input/output devices, such as a microphone (not shown) for receiving audio user input and, as shown, one or more speakers **108** for providing audio output. Other examples of I/O devices may include, for example, a mouse, an optical reader, and/or a stylus (or other input device(s)) through which a user of the automated device **100** may provide input.

[0042] An access card may be received, through a card slot **110**, into the automated device **100** to be read by a card reader **112**. In some examples, the card reader **112** reads a magnetic strip on the back of the access card to extract information stored thereon. Information may be stored in an integrated circuit (IC) chip embedded within the access card in addition to, or instead of, the magnetic strip, which may be read by the card reader **112**. The information read by the card reader **112** may be used to perform functions such as card authentication, card holder validation, and/or account information retrieval.

[0043] User interactions with the automated device **100** may include insertion of physical input (e.g., cash and/or check, or other physical representations of data) through one or more input slots **114**. The automated device **100** may incorporate sensors (e.g., an optical scanner **122**) and/or a digital image processor (not shown) to process the received physical input. Physical output, such as cash, may be extracted from a vault **116** inside the automated device **100** and dispensed to the user through an output slot **118**. Another output slot **119** may be used to provide a physical record, such as a paper receipt, of the user's interactions with the automated device **100** during a session. A session on the automated device **100** may be defined to include the inputs, outputs provided on the automated device **100** from the start of user interaction with the automated device **100** (e.g., starting with insertion of an access card into the card slot **110**) and ending when the user chooses to end interactions with the automated device **100** (e.g., user provides input to the automated device **100** indicating that all desired actions have completed and/or user logs out). The physical record may be generated by a printer **120** inside the automated device **100**. Additionally or alternatively, a record of the

session may be emailed to the user. The automated device **100** may include a camera **124**, which may be used to record video (e.g., for security purposes) and/or to facilitate interaction between the user and a local or remote agent.

[0044] Internally, the automated device **100** includes a processing unit **126** for controlling overall operation of the automated device **100**. The processing unit **126** may be operably coupled to one or more of random access memory (RAM) **128**, read-only memory (ROM) **130**, memory **132**, and input/output (I/O) devices such as those described above. Machine-executable instructions may be stored within memory **132** and/or other storage to provide instructions to the processing unit **126** for enabling the automated device **100** to perform various functions. For example, the memory **132** may store instructions for implementing an operating system **134**, and one or more application programs **136**. The memory **132** may also store data **138** locally. Additionally or alternatively, some or all of the machine-executable instructions for the automated device **100** may be embodied in hardware or firmware (not shown). In this example, the automated device **100** further includes a communication module **140**, for wired and/or wireless communication with other network devices (see FIG. **3**, for example).

[0045] FIG. **3** shows an example network **300** in which the example automated device **100** may be implemented. In this example, a plurality of automated devices **100***a*-**100***n* may be connected, through a communication network **304**, to a server **306** via any suitable communications links, such as network links, wireless links, hard-wired links, and the like. Each of the automated devices **100***a*-**100***n* may be an instance of the automated device **100** of FIG. **1**, or other suitable automated device. The automated devices **100***a*-**100***n* may be the same or different from each other.

[0046] The communication network **304** may include any one or more suitable computer networks including, for example, the Internet, an intranet, a wide-area network (WAN), a wireless WAN (WWAN), a local-area network (LAN), a wireless LAN (WLAN), a wireless network, a digital subscriber line (DSL) network, a frame relay network, an asynchronous transfer mode network, a virtual private network (VPN), a public-switched telephone network (PSTN), or a public-land mobile network (PLMN), or any combination of any of the same. Network communications may be facilitated through the use of any suitable communication such as TCP/IP, Ethernet, FTP, HTTP, HTTPS, and the like. The communication network **304** may be, or may include, an interbank network (which may also be referred to as an ATM consortium or ATM network).

[0047] The server **306** may be a backend server associated with the same service provider as the automated devices **100***a*-**100***n*. The server **306** may be referred to as a first party server. The server **306** may be operable to communicate signals and exchange data with each of the plurality of automated devices **100***a*-**100***n*. The server **306** in this example network **300** is also coupled to a database **308** that may store data (e.g., user account information) accessible by the server **306**. The data stored by the database **308** comprises user account information and provisioning data for data transfers in corresponding records. The database **308** is located externally to and remote from the automated devices **100**. The server **306** in this example network **300** is also coupled to a third party server **310**, which may provide third party services, such as authentication services, or may be associated with another service provider (e.g., another financial institution). The server **306** may be coupled to the database **308** and/or the third party server **310** via one or more networks (not shown). It is to be appreciated that although one instance each of the server **306**, database **308**, third party server **310** and communication network **304** are shown, any of the components in FIG. **3** may be present in any number.

[0048] The server **306** includes a controller, including at least one processor which controls the overall operation of the server **306**. The processor is coupled to a plurality of components via a communication bus which provides a communication path between the components and the processor. The processor is coupled to a communication module that communicates with corresponding communication modules of the automated devices **100** and the third party server **310** by sending and receiving corresponding signals. The server **306** may include, or may communicate with, a data transfer server (not shown) which generates data transfer instructions via an instruction generation module, sends and/or receives data transfer instructions between various endpoints (e.g., the automated devices **100**, the server **306**, the third party server **310**, etc.) and which may process data transfer instructions via an instruction processing module.

[0049] The implementation of the methods described herein include a sequence of interfaces, also referred to as user interfaces or graphical user interfaces (GUIs), to be provided by the automated device, as discussed below. One or more interfaces in the interface sequence may provide one or more selectable options as discussed below, each selectable option being selectable, for example by interacting with a touchscreen and/or a keypad **104** of the automated device **100**. The selection options are provided in onscreen buttons or other user interface elements. The selectable options, when selected via corresponding interaction, cause different interfaces to be displayed which may, in some instances, involve communications between the automated device **100** and the server **306** to obtain information to dynamically populate interfaces in the interface sequence. The methods described herein may be implemented during a session with the automated device **100**, for example as a portion of the session. The methods described herein may be implemented together to provide a sequence of interfaces.

[0050] FIG. **4** is a flowchart of an example method **400** for initiating a session on an automated device. The method **400** may be performed by the automated device **100** illustrated in FIG. **1**, for example. For convenience, reference will be made to the automated device **100** illustrated in FIG. **1** although automated devices having different features may be used in other embodiments. The session is initiated to perform one or more actions using the automated device. In the present disclosure, the session is initiated to request a physical output from the automated device. The physical output maybe provided as part of updating or otherwise changing the data stored in an account managed by a server that is in communication with the automated device. The account may be an account at a service provider (e.g., a financial institution) that is associated with the automated device. In particular, a data update may involve updating the account to add (or credit) the data value represented by a physical input, as discussed further below. Data update information, also referred to as provisioning data or data transfer information, may specify how to send and/or receive data updates, including data update signals and other com-

munications and any messages contained therein. The data updates may include messages.

[0051] At **402**, an access card is received by the automated device (e.g., via a card slot on the automated device).

[0052] At **404**, the access card is processed by the automated device (e.g., using a card reader) to extract information stored on the access card. The information extracted from the access card may include information used to identify whether the access card is associated with an account that is managed by a service provider (e.g., financial institution) that owns or manages the automated device, or whether the access card is associated with a third party.

[0053] At **406**, the automated device transmits the information extracted from the access card to a backend server, for example a first party server owned or managed by the same service provider that owns the automated device, to identify and/or retrieve information about one or more associated accounts. Where the server determines that the access card is associated with a third party, the server may further communicate with a third party server to retrieve account information.

[0054] The server transmits to the automated device a signal providing information identifying the account(s) associated with the access card. The information provided by the server may include information indicating whether the access card is associated with an account that is managed by a third party service provider, for example.

[0055] At **408**, in response to receipt of the information from the server, the automated device displays, the interface **700** shown in FIG. **7** (also referred to as a welcome interface).

[0056] As shown in FIG. **7**, the interface **700** includes a plurality of selectable options **702***a*-**702***d* (generally referred to as options **702**), which may be selected to initiate an action using the automated device. The options **702** displayed at the interface **700** may be a subset of all available actions that may be performed using the automated device. In some examples, the options **702** displayed at the interface **700** may depend on the capabilities of the automated device and/or the actions that are permissible for the account(s) (e.g., as determined based on the inserted access card). For example, if the account is managed by a third party service provider, the options **702** may be more limited than if the account is managed by the same service provider that owns the automated device. The provided options **702** may depend on the capabilities of the automated device, for example whether the automated device is able to provide certain types of output (e.g., cash or foreign currency). The options **702** may also be dynamically modified based on the current state of the automated device. For example, the automated device may normally be capable of providing a certain type of output (e.g., cash) but may be in a current state in which that capability is not available (e.g., the automated device has run out of cash).

[0057] In FIG. **7**, the displayed selectable options **702** include an option **702***a* for providing express physical output (e.g., express withdrawal of cash), an option **702***b* for providing physical output (e.g., regular withdrawal of cash), an option **702***c* for providing physical input (e.g., deposit of cash and/or check), and an option **702***d* for performing a data transfer between accounts. The interface **700** also provides an option **704** for displaying more available actions.

[0058] The interface **700** in this example also includes selectable general options **706***a*-**706***c* (generally referred to as general options **706**). The general options **706** may include options concerning general operation of the automated device, and may not be related to any specific action or workflow performed using the automated device. As shown, the general options **706** are provided in a lower portion **708** of the user interface **700**, for example, in a bar, panel or frame at or near the bottom of the welcome interface **700**. The general options **706** in this example include an option **706***a* for selecting a language preference, an option **706***b* for displaying accessibility options, and an option **706***c* for returning the access card and ending the session with the automated device. The option **706***a* is displayed on the left side of the lower portion **708**, the option **706***b* is displayed at the middle of the lower portion **708**, and the option **706***c* is displayed on the right side of the lower portion **708**. Other locations for the general options **706** may be used. The general options **706** may each be provided at the same location over a plurality of interfaces during the session, which may help a user to more easily find each of the general options **706**. In particular, the location of the option **706***b* may enable a user with limited mobility and/or limited reach to more easily select the option **706***b* for displaying accessibility options.

[0059] The user interface **700** may also include a greeting **710**. In some examples, the greeting **710** may include non-sensitive customized information, such as a name associated with the user account. Such customized information may be obtained via communication between the automated device and the server. For example, such information may be provided to the automated device together with identification of the account(s) associated with the access card.

[0060] At **410**, directly in response to selection of one of the options **702** and **704**, the automated device proceeds to display of the interface **800** of FIG. **8** (also referred to as an authentication interface). The interface **800** enables receipt of input of an authentication code associated with the account. The interface **800** may also be referred to as an authentication code entry screen or PIN entry screen.

[0061] The interface **800** provides a field **802** for entry of an authentication code (e.g., PIN) associated with the account (e.g., as identified via the inserted access card). Where there are multiple accounts associated with the access card, the same authentication code may be used for all the accounts. In this sense, the authentication code may also be considered to be an authentication code that has been set for the access card. For example, a user may use the keypad of the automated device to provide input into the field **802**. The keypad may also provide the ability to backspace or cancel input. Other input mechanisms may also be used. The interface **800** provides a confirmation button **804** to confirm entry of the authentication code. The interface **800** also provides the general options **706** as discussed above. When the confirmation button **804** is selected, the input into the field **802** is received by the automated device. In some examples, instead of selecting the confirmation button **804**, the user may use a physical button (e.g., a physical confirmation button or "OK" button, which may be part of the keypad) to confirm entry of the authentication code. Input using a physical confirmation button may be interpreted to be selection of the confirmation button **804**. It should be generally understood that, in the present disclosure, selection of any confirmation button may be alternatively input using a physical confirmation button, such as an "OK" button on the keypad.

[0062] At **412**, the automated device transmits the received input to the server. The server performs validation, for example by comparing the received input to an authentication code associated with the account. If the validation is successful (i.e., the received input matches the authentication code associated with the account), the server transmits a signal to the automated device to indicate that validation is successful. If the validation is not successful (i.e., the received input does not match the authentication code associated with the account), the server transmits a signal to the automated device to indicate that validation failed.

[0063] If validation failed, the automated device may generate output (e.g., a visual display) to indicate that the received input does not match the current authentication code. The automated device may again present the interface **800** to prompt the user to re-enter the authentication code.

[0064] The automated device may display the user interface **900** of FIG. **9** after receiving the input via the interface **800** and before the signal is received from the server. The interface **900** may also be referred to as a processing screen or a wait screen.

[0065] The user interface **900** in this example includes an animation **902** to indicate processing. Other indicators, with or without animation, may be used. The user interface **900** in this example also displays information **904**. The displayed information **904** may or may not be related to the current action being performed, may or may not be specific to the account, and may or may not be specific to the service provider.

[0066] The information **904** may be used to inform the user of features and options provided by the automated device and/or service provider associated with the automated device. This may enable new features/options, useful features/options or rarely used features/options to be brought to the user's attention. The information **904** may also provide general user appreciation information, marketing information, or other customized or non-customized information. In some examples, the information **904** may provide customized information, for example customer appreciation information associated with the account, or marketing information customized to the account. Such customized information may be dynamically generated, based on account information provided by the server. In some examples, the information **904** may include dynamic information (e.g., time of day, current temperature, etc.) which may be updated by the automated device, or may be provided to the automated device by the server. The interface **900** may be omitted in other embodiments in which the processing or waiting time is negligible.

[0067] At **414**, in response to receipt of a signal from the server that the input received at **410** is validated, the automated device may proceed to display the interface **1000** of FIG. **10**A or the interface **1200** of FIG. **12**A (both of which may be referred to as an account selection interface) providing selectable account options. Whether the interface sequence displays the interface **1000** or the interface **1200** depends on the selection made at the interface **700** at step **408**.

[0068] Where the option **702***b* to provide physical output was selected at **408**, the interface **1200** of FIG. **12**A is displayed at **414**. The interface **1200** enables selection of an account to provide physical output, and to be updated with the data value of the physical output. Notably, the interface **1200** provides options in the context of providing physical output. This may help to speed up interactions with the automated device.

[0069] The interface **1200** includes a context indicator **1202** indicating that the selection of accounts is in the context of providing physical output, in accordance with the selection of the option **702***b* in the earlier interface **700**. The interface **1200** includes general options **706**, as discussed above.

[0070] The interface **1200** displays one or more selectable account options **1220***a*-**1220***d* (generally referred to as account options **1220**) for selecting an account that has been identified, for example via the inserted access card and communications with the server as discussed above. There may be a plurality of accounts associated with the access card, each of which may be associated with different data and which may be used for providing physical output. Each of account options **1220** may provide some identifying information about the account associated with the respective option, but the identifying information may be at least partially protected (e.g., using * symbols) to avoid sensitive information being inadvertently exposed. In this example, the account options **1220** include options **1220***a* and **1220***b* to select a checking account, an option **1220***c* to select a savings account, and an option **1220***d* to select a credit card account.

[0071] The interface **1200** also provides a selectable option **1222** to display further information about all the accounts associated with the displayed account options **1220**. For example, the option **1222** may be selected to cause the account options **1220** to display the current state (e.g., current balance) of each associated account. The option **1222** in this example includes the message "Show balance" and a representative icon or other visual indicator to provide a visual cue. In this example, selecting the option **1222** causes the interface **1250** of FIG. **12**B (also referred to as an alternate account selection interface) to be displayed. The interface **1250** is similar to the interface **1200**, and the two interfaces **1250**, **1200** have common elements. The interface **1250** may be considered a sub-screen, a variation or a transition of the interface **1200**. Thus, in some cases, the interface **1250** and the interface **1200** may be considered to be the same interface. In the interface **1250**, each account option **1220** is modified to include a visual indication of the current state of the respective associated account (e.g., shows the numerical current balance in each account), and the option **1222** is replaced by an option **1252** to hide the further information. The option **1252** in this example includes the message "Hide balance" and a representative icon or other visual indicator to provide a visual cue. Selection of options **1222** and **1252** may enable a user to toggle or switch between the interfaces **1200** and **1250**. Generally, the options and functions available at the interface **1200** are the same at the interface **1250**, with the exception of the options **1222** and **1252**.

[0072] In cases where the number of accounts that have been identified for the access card exceed the number of displayable account options **1220**, the user interface **1200** also provides scroll options **1224** to scroll to display of additional account options associated with additional accounts.

[0073] The information displayed for the options **1220** (e.g., identification of the associated accounts and further information about the current state of each account) may be

dynamically provided by the server. For example, the automated device may query the server in real-time (e.g., in response to selection of the option **1222**) to obtain the account information to be displayed. The options **1220** may thus be customized in real-time, to provide information that is relevant to the current action and current session at the automated device.

[0074] Selection of one of the account options **1220** causes the method **400** to proceed to **418**, where the automated device displays the interface **1300** of FIG. **13** for selecting the data value for a physical output (discussed further below). The physical output is to be provided by the account associated with the particular selected account option, and the associated account is to be updated with the data value of the physical output.

[0075] Where the option **704** to display more options was selected at **408**, the interface **1000** of FIG. **10**A (also referred to as another example of an account selection interface) is displayed at **414**. Unlike the interface **1200** of FIG. **12**A, the interface **1000** of FIG. **10**A is not in the context of providing physical output.

[0076] The interface **1000** provides a plurality of selectable options **1002***a*-**1002***f* (generally referred to as selectable options **1002**) for performing an action. The options **1002** may be similar to the options **702** provided by the interface **700** of FIG. **7**, and may include additional options **1002** not displayed in the interface **700**. In this example, the selectable options **1002** include an option **1002***a* for providing express physical output (e.g., express withdrawal of cash), an option **1002***b* for providing physical output (e.g., regular withdrawal of cash), an option **1002***c* for providing physical input (e.g., deposit of cash and/or check), an option **1002***d* for performing a transfer (e.g., of data or funds) between accounts, an option **1002***e* for performing one or more bill payments, and an option **1002***f* for changing an authentication code (e.g., a PIN).

[0077] The interface **1000** in this example also includes general options **706** as discussed above. Optionally, the interface **1000** may also include a greeting **1020**. In some examples, the greeting **1020** may include non-sensitive personalized information, such as a name associated with the user account. As discussed above, such customized information may be dynamically generated using information received from the server.

[0078] The interface **1000** also displays one or more selectable account options **1020***a*-**1020***d* (generally referred to as account option **1020**), similar to the account options **1220** described above. The account options may be populated with information received from the server, as discussed above.

[0079] The interface **1000** also provides a selectable option **1022** to display further information about all the accounts associated with the displayed account options **1020**. For example, the option **1022** may be selected to cause the account options **1020** to display the current state (e.g., current balance) of each associated account. In this example, selecting the option **1022** causes the interface **1050** of FIG. **10**B (also referred to as another example alternate account selection interface) to be displayed. The interface **1050** is similar to the interface **1000**, and the two interfaces **1050**, **1000** have common elements. The interface **1050** may be considered a sub-screen, a variation or a transition of the interface **1000**. Thus, in some cases, the interface **1050** and the interface **1000** may be considered to be the same interface. Similar to the interface **1250** of FIG. **12**B, in the interface **1050**, each account option **1020** is modified to include a visual indication of the current state of the respective associated account (e.g., shows the numerical current balance in each account), and the option **1022** is replaced by an option **1052** to hide the further information. Selection of options **1022** and **1052** may enable a user to toggle or switch between the interfaces **1000** and **1050**. Generally, the options and functions available at the interface **1000** are the same at the interface **1050**, with the exception of the options **1022** and **1052**.

[0080] In cases where the number of accounts that have been identified for the access card exceed the number of displayable account options **1020**, the user interface **1000** also provides scroll options **1024** to scroll to display of additional account options associated with additional accounts.

[0081] If the option **1002***b* to provide physical output is selected, the automated device proceeds to display the interface **1200** of FIG. **12**A, to select an account to provide the physical output and to be updated with the data value of the physical output.

[0082] Each account option **1020** is selectable in order to display further information (e.g., recent data history such as recent exchanges of data on that account) about the individual account associated with the selected option **1020** and/or to initiate an action for that individual account.

[0083] Directly in response to selection of an account option **1020**, the method **400** proceeds to **416** where the automated device displays the interface **1100** of FIG. **11** (also referred to as an account information interface). The interface **1100** provides further information about the specific selected account. For example, the automated device may query the server in order to obtain further information for the selected account, in order to dynamically generate the interface **1100**. The automated device may transmit a signal to the server indicating the selected account (e.g., including an identifier for the selected account) for which further information is requested. In response, the server may transmit a signal to the automated device providing up-to-date information about the account, such as the current state (e.g., current balance) of the account, and historical information (e.g., recent data transfers, such as recent bill payments) for the account. In this way, the automated device may dynamically generate the interface **1100** to provide up-to-date information about the selected account in real-time.

[0084] The interface **1100** includes a context indicator **1102** indicating that the interface **1100** is in the context of the particular selected account. The interface **1100** also provides information about the selected account, such as information **1104** indicating the current state of the account (e.g., current amount of funds held in the account) and information **1106** indicating recent exchanges of data performed on the account. A scroll button **1108** may be provided to enable viewing of additional information **1106**.

[0085] The interface includes an option **1110** to provide output (e.g., a physical printed output, or an electronic output) showing the information **1106**. The interface **1100** also includes selectable options **1112***a*-**1112***c* (generally referred to as options **1112**) for updating the selected account. The options **1112** may be a subset of the options **1002** provided at the interface **1000** of FIG. **10**A. In the example shown, the options **1112** include an option **1112***a* for providing physical output, an option **1112***b* for providing

physical input, and an option **1112***c* for exchange of data between accounts. The options **1112** may be dynamically customized depending on the context of the selected account. For example, if the selected account is associated with a particular data format (e.g., foreign currency) for which the automated device is not capable of providing physical output, the option **1112***a* for providing physical output for the selected account may be disabled or not displayed. The interface **1200** also includes general options **706** as discussed above.

[0086] Directly in response to selection of the option **1112***a* for providing physical output, the method **400** proceeds to **418** where the automated device displays the interface **1300** of FIG. **13** to select the data value of the physical input (discussed further below). The account to provide the physical output, and to be updated with the data value of the physical output, is the account associated with the account option selected at the interface **1000**.

[0087] FIG. **5** is a flowchart of an example method **500** for providing a physical output by the automated device. The method **500** may follow the method **400** described above. The method **500** may be performed by the automated device **100** illustrated in FIG. **1**, for example.

[0088] At **502**, the automated device displays the interface **1300** of FIG. **13** (also referred to as a data value selection interface). The interface **1300** is to receive a user input (also referred to as a first user input), which indicates a data value for requesting a physical output from the automated device. A corresponding account may be updated with the data value to reflect the transaction. The account may be a user account, which may be identified via an access card inserted into the automated device and via communications with a server, as discussed above. The account may be a user account that is managed by the service provider that is associated with the automated device.

[0089] The interface **1300** may provide a plurality of selectable options for providing physical output of a pre-defined value. The pre-defined values may be associated with the type of physical output that is made available by the automated device (e.g., the ability of the automated device to provide cash or foreign currency). In this example, options **1302***a*, **1302***b*, **1302***c*, and **1302***d* (generally referred to as selectable options **1302**) each represents a pre-defined value of physical output. A selection of the selectable options **1302** may constitute as the user input, and the data value indicated by the user input may be assigned with the pre-defined value represented by the selected option. One or more of the selectable options **1302** may be assigned a pre-defined value that was selected by the user historically in the past. In this example, option **1302***d* is assigned with a value of physical output that was selected by the user in a previous physical output request as indicated by text indicator **1304**. For example, the automated device may communicate with the server to receive information about a historical physical output that was provided, in association with the current access card or in association with the currently selected account. A graphical indicator (e.g., highlighting options **1302**) may be used to indicate the current user selection. The interface also includes general options **706** as discussed above.

[0090] In this example, the interface **1300** also provides a field **1306** for entry of a user input indicating a data value of the requested physical output. The user input may be entered via the keypad of the automated device. In some embodiments, the user input may be restricted by the formats of the physical output that the automated device is capable of providing (e.g., the bill denominations stored in the automated device). The interface **1300** includes a confirmation button **1312** to confirm the data value for the physical output that is entered via field **1306**. The confirmation button **1312** may be disabled (e.g., as indicated by graying out the confirmation button **1312**) until a value has been entered into the field **1306**.

[0091] The interface **1300** also includes a context indicator **1308**, which provides information about the context of the currently displayed interface **1300**. In this case, the context indicator **1308** indicates that the interface **1300** is part of the interface sequence for providing physical output. Using information received from a preceding interface (e.g., received at interface **1100**, **1200** or **1250**), an additional context indicator **1309** is provided in this example to reflect the currently selected account.

[0092] The interface **1300** receives input when one of the options **1302** is selected, or when a data value is entered in the field **1306** and confirmation button **1312** is selected. Directly in response to receipt of the data value, the method **500** proceeds to **504** to display the interface **1400** of FIG. **14** (also referred to as a format selection interface) for selecting a format of the physical output.

[0093] The interface **1400** may include a plurality of selectable options for choosing a format of the physical output. The selectable options may be restricted by the format of the physical output currently available at the automated device, and the options displayed for selecting a format may be dynamically modified depending on the current capabilities of the automated device (e.g., depending on the current availability of certain bill types at the automated device). In this example, physical output in the form of cash is illustrated where selectable options **1402***a*, **1402***b*, **1402***c*, **1402***d*, and **1402***e* (generally referred to as selectable options **1402**) represent different bill denominations in which the physical output could be provided by the automated device. The options **1402** displayed may be dynamically modified depending on the received data value for the physical output. For example, if the received data value is smaller than 100, the option **1402***e* for selecting a $100 format for the physical output may be disabled or not displayed.

[0094] Each of selectable options **1402** includes two manipulators **1404***a* and **1404***b* for modifying a quantity value of the corresponding bill denomination. A text indicator **1404***c* is included to show the current quantity value of the corresponding bill denomination. In this example, the manipulator **1404***a* may be used to decrease the quantity value and manipulator **1404***b* may be used to increase the value for a given selectable option **1402**. Although manipulators **1404***a*, **1404***b* and text indicator **1404***c* are shown here, it is to be appreciated by those skilled in the art that other methods, such as physical input via keypad, or other forms of manipulators (e.g., "+" and "−") are contemplated.

[0095] An indicator **1406** is included for each of the selectable options **1402** to show a value of a portion of the physical output that is based on the bill denomination value and the selected quantity value of the denomination. In this example, the indicator **1406** for the selectable option **1402***a* shows a value of twenty dollars ($20) for a selection of four (4) five-dollar ($5) bills, the indicator **1406** for the selectable option **1402***b* shows a value of twenty ($20) for a selection

of two (2) ten-dollar ($10) bills, and the indicator **1406** for selectable option **1402***c* shows a value of eighty dollars ($80) for a selection of four (4) twenty-dollar ($20) bills. A particular indicator **1406** may be hidden from view if the selected quantity value is 0 as shown for selectable options **1402***d* and **1402***e*.

[0096] Interface **1400** includes another textual indicator **1408** to indicate the data value of the requested physical output as received at the interface **1300**. The data value of the requested physical output may be used to restrict the quantity value of individual selectable options **1402**. In some examples, if the sum of the selected physical output format yields a physical output data value that differs from the data value indicated by user input received in interface **1300**, the user may be prevented from proceeding further in the method **500** by disabling the confirmation button **1410** until the format has been changed such that the corresponding value of the physical output equals the data value indicated by user input received in interface **1300**. In some examples, in response to any modification of the physical output format, each of the options **1402** may be automatically and dynamically updated in order to maintain a total that matches the requested data value. For example, if received input at the option **1402***b* increases the $10 format by one, the option **1402***a* may automatically be decreased by two in order to maintain the same total data value.

[0097] In some examples, upon displaying interface **1400**, a default format could be automatically selected and is reflected by the selectable options **1402**. The default format may be based on commonly requested format or a format that the user had historically requested for the same data value of physical output. The user may proceed to the next step in method **500** by confirming the default format without any modification of the selectable options **1402**. Alternatively, if desired, the user may make further adjustments to the default format using selectable options **1402**. Such default format may advantageously avoid or minimize mental exercises by the user and may expedite the user's interaction with the automated device.

[0098] The example shown in FIG. **14** further includes the indicator fields **1308**, **1310**, and general options **706**, as discussed above.

[0099] In this example, a confirmation button **1410** is provided to confirm the format of the physical output. Directly in response to selection of confirmation button **1410**, the method **500** proceeds to **506**. The automated device at **506** transmits a signal (also referred to as a first signal) to a server (e.g., a server associated with the service provider that owns the automated device), for example using a communication module of the automated device. The server may be a backend server that stores and/or manages data for accounts of the service provider. The server may be the server **306** of FIG. **3**. In the context of FIG. **3**, the automated device **100** may transmit a signal to the server **306** via the communication network **304**. The signal sent by the automated device includes at least the data value of the requested physical output.

[0100] The server performs necessary processing on the received signal. For example, the server may verify if the selected account is capable of providing the requested amount of physical output (e.g., if the current state of the selected account has sufficient data value for the requested physical output), or if any restrictions (e.g., daily physical output limit) may affect the requested physical output. If the request is permitted, then the server may update the corresponding account with the data value of the requested output. A signal indicating the server processing outcome (also referred to as a second signal) is sent back to the automated device. It should be noted that, in some cases, the server may not necessarily update the account at the time that the physical output is requested and provided at the automated device. For example, the server may store information about the data value of the requested physical output and may reconcile the account at a later time, such as end of business day.

[0101] During communication between the automated device and the server, at **506**, the automated device may display the interface **1500** of FIG. **15** (also referred to as a data update processing interface) indicating processing of the physical output request. The interface **1500** may also be referred to as a processing screen or a wait screen. The interface **1500** may be displayed after the data value and format of the requested physical output have been received and before the automated device receives the signal from the server that the requested physical output has been processed. The interface **1500** may be omitted in other embodiments in which the processing or waiting time is negligible.

[0102] The interface **1500** in this example includes an animation **1502** to indicate processing. Other indicators, with or without animation, may be used. The user interface **1500** in this example also displays information **1504**. The displayed information **1504** may or may not be related to the current action being performed, may or may not be specific to the account, and may or may not be specific to the service provider.

[0103] The information **1504** may be used to inform the user of features and options provided by the automated device and/or service provider associated with the automated device. This may enable new features/options, useful features/options or rarely used features/options to be brought to the user's attention. The information **1504** may also provide general user appreciation information, marketing information, or other customized or non-customized information. In some examples, the information **1504** may provide customized information, for example customer appreciation information associated with the account, or marketing information customized to the account. Such customized information may be dynamically generated, using information received from the server, as discussed above. In some examples, the information **1504** may include dynamic information (e.g., time of day, current temperature, etc.) which may be updated by the automated device, or may be provided to the automated device by the server.

[0104] Directly in response to receipt of the signal (also referred to as the second signal) from the server indicating that the request for physical output has been processed, at **508** the automated device displays the interface **1600** of FIG. **16** (also referred to as an acknowledgement interface). The interface **1600** provides an option **1602** to end the session and an option **1604** to continue the session.

[0105] The interface **1600** may also include information **1606**, which may be the same as, similar to, or different from the information **1504** provided by the interface **1500** of FIG. **15** as discussed above. The interface **1600** may also provide a selectable option **1608** to provide additional information further to the information **1606**. The interface **1600** may indicate the account has been updated and that the physical output has been provided in field **1610**. Field **1610** may

further provide details about the update such as a confirmation number, which may be used to track and/or confirm completion of the physical output, and/or the data value used for the update, and the account that is updated.

[0106] When the interface **1600** is displayed, the automated device may provide other output, such as turning on or flashing a light, to indicate the location of an opening (e.g., the output slot **118** as shown in FIG. **1**) for providing the physical output. The automated device may also open a flap or door to permit the physical output out of the opening.

[0107] If the option **1602** is selected, the automated device may return to a previous interface, such as interface **1000** of FIG. **10**A, or another interface, to enable the session to continue.

[0108] At **512**, directly in response to selection of the option **1604** to end the session, the automated device displays the interface **1700** of FIG. **17** (also referred to as a record preview interface). The interface **1700** provides a preview **1702** of a record of the session (e.g., in a visual form similar to a paper receipt). The record includes all data exchanges performed during the session. The interface **1700** also provides one or more options **1704***a*-**1704***c* (generally referred to as options **1704**) to generate output of the record. The options **1704** in this example include an option **1704***a* to generate a physical output (e.g., paper receipt) of the record, an option **1704***b* to generate a digital output (e.g., transmission of an email or other digital communication) of the record, and an option **1704***c* to generate both a physical and a digital output of the record. The interface **1700** also provides an option **1706** to not generate output of the record.

[0109] Where a digital output of the record is selected, the digital output of the record may be transmitted to an email address linked to the account. The email address may be predefined and associated with the account, thus avoiding the need for a user to manually input the email address and thereby facilitating a faster and more convenience interaction. For example, the automated device may receive a signal from the server providing the email address. The option **1704***b* to generate a digital output of the record can thus automatically include at least a preview of the email address. In this way, a user can be sure that the digital output of the record (which may include sensitive, personal information) is being sent to the correct email address. When the digital output is an email and the option **1604***b* to generate the digital output is selected, a digital version of the record is sent to the email address via the communication module **140**. The email may be sent directly by the automated device (e.g., via an email client) or may be sent via the first party server. Where the email is sent via the first party server, the automated device may transmit a signal to the first party server via the communication module, the signal including information for generating the record, and the first party server in turn generates and transmits the email to the email address.

[0110] FIG. **6** is a flowchart of an example method **600** for ending a session on an automated device. The method **600** may follow the method **500** of FIG. **5**. The method **600** may be performed by the automated device **100** illustrated in FIG. **1**, for example.

[0111] At **602**, the automated device receives selection of an option to proceed to end a current session on the automated device. For example, selection of any of the options **1704**, **1706** provided by the interface **1700** of FIG. **17** may be selection of an option to proceed to ending the session.

[0112] At **604**, directly in response to the selection of any of the options listed above, the automated device displays the interface **1800** of FIG. **18** (also referred to as an account selection interface). The interface **1800** provides customer appreciation information **1802**. The customer appreciation information **1802** may include information specific to the account (e.g., number of days since the account was started with the service provider). The customer appreciate information **1802** may show only non-sensitive information. Certain information about the account may be requested by the automated device from the server, in order to dynamically generate account-specific customer appreciation information **1802**. The interface **1800** may also include other information **1804**, such as a general thank you message. Other types of information (e.g., similar to the information **1504** provided by the interface **1500** of FIG. **15**) may be provided by the interface **1800**. Where the option **1704***a* or **1704***c* was selected at the interface **1700** of FIG. **17**, to generate a physical output of the session record, the interface **1800** may provide reminder information **1806** relevant to the physical output. Where a physical output was not selected at interface **1700**, the reminder information **1806** may be omitted or may be modified to not refer to the physical output.

[0113] At **606**, the inserted access card is ejected from the automated device. The access card may be ejected while the interface **1800** is being displayed. The interface **1800** may be displayed for a preset length of time (e.g., 5 seconds), or until the automated device detects that the access card has been removed.

[0114] Optionally, one or more of the user interfaces discussed above may include display of a background image (which may be the same or may differ between different user interfaces within a session). The background image may include animation for example. The background image may be different for different users, change depending on the season, change depending on the time of day, or have other such variations.

[0115] Optionally, one or more of the interfaces discussed above may also include branding, such as the logo of a service provider associated with the automated device.

[0116] In some examples, one or more processing or waiting screens may be skipped. For example, processing or waiting time may be negligible and the corresponding processing or waiting screen may not be displayed.

[0117] In the present disclosure, the automated device communicates with a server to exchange data which is used to dynamically populate one or more of the interfaces that are displayed by the automated device in a sequence of interfaces. The interfaces are presented in a sequence that provide an improved user experience with an automated device when performing actions related to exchange of data managed by a service provider. For example, the number of interfaces a user must navigate in order to complete an action may be reduced, by ordering the interfaces in a particular sequence. The interfaces also provide more streamlined and efficient interaction, by including contextual or summary information in the interfaces (e.g., visual cues, guidance or nudge) throughout the sequence without cluttering the interfaces with unnecessary information.

[0118] It should be appreciated that designing an effective user interface is not a process which is predictable or which lends itself to trial and error given the vast number of permutations that are possible. Factors affecting whether a user interface is effective include identifying efficient interactions which are relatively easy to perform, relatively easy to remember, have discoverability which allows users to discover functions during normal use without formal training, and which can be differentiated from other interactions by users and by the device relatively easily. Arbitrary or poorly considered user interfaces tend to create awkward and unnatural user experiences which make the required interaction harder to perform, harder to remember, undiscoverable (or at least less discoverable), and harder to differentiate from other interactions. Given the complex nature of human-machine interactions, effective user interfaces cannot be reliably predicted. This is known to the person of ordinary skill in the art of user interface design.

[0119] Studies performed with regard to examples of the disclosed sequence of interfaces have found increased user satisfaction with respect to interactions with the automated device across a variety of user groups.

[0120] In some examples, the sequence of interfaces may begin with an interface that displays options that are available at the automated device. The options that are displayed may depend on the account(s) associated with an inserted access card, may depend on the capabilities of the automated device and/or may depend on a current state of the automated device. In this way, a user is provided information about actions that may be performed using the automated device at the very start of the session, prior to entry of an authentication code. This may enable the session to skip displaying another interface that shows available options, and shorten the interface sequence. The user may also be able to determine from the start whether a desired action can or cannot be completed using the automated device.

[0121] In some examples, the sequence of interfaces may include interfaces that implicitly or explicitly confirm a selection made in a prior interface. For example, an interface may display contextual information that indicates the interface is part of an interface sequence used to perform a prior-selected action. An interface may also display contextual information to indicate that the action is being performed in the context of a particular prior-selected account.

[0122] In some examples, the automated device may provide an interface displaying a preview of a record of the session (e.g., a preview of a transaction receipt). The interface may also provide options for outputting the record, for example printing a physical copy of the record (e.g., using a printer peripheral of the automated device) and/or outputting a digital copy of the record to an email address associated with the account. The interface may exchange data with the backend server in order to retrieve the email address associated with the account (e.g., a primary email address in the case where there are multiple email addresses associated with the user account). In some cases, the interface may also display a preview of the email address (e.g., showing the first several characters of the email address), to assure the user the copy of the record is being sent to the correct email address. The interface may also provide an option to not generate an output of the record, for example the user may be satisfied after viewing the preview of the record on the interface.

[0123] In some examples, an interface may display information that is personalized or customized based on the user account. The customized information may be non-sensitive information (e.g., not related to financial data). The non-sensitive information may be a form of customer appreciation information. Such personalized information may be displayed without interfering with the sequence of interfaces required to perform an action. For example, such personalized information may be displayed at the beginning of a session, at the end of a session, or as part of an interface within the sequence. Displaying such non-sensitive, personalized information may help to convey a sense of appreciation, and help to engender user loyalty or goodwill towards the service provider. As an example, the number of days a user has been a customer of the service provider may be displayed at the end of a session. The interface may also display information may be used to inform the user of features and options provided by the automated device and/or service provider associated with the automated device. This may enable new features/options, useful features/options or rarely used features/options to be brought to the user's attention. The information may also provide general user appreciation information, marketing information, or other customized or non-customized information.

[0124] Although the present disclosure is described, at least in part, in terms of methods, a person of ordinary skill in the art will understand that the present disclosure is also directed to the various components for performing at least some of the aspects and features of the described methods, be it by way of hardware (digital signal processors (DSPs), application specific integrated circuits (ASICs), or field-programmable gate arrays (FPGAs)), software or a combination thereof. Accordingly, the technical solution of the present disclosure may be embodied in a non-volatile or non-transitory machine-readable medium (e.g., optical disk, flash memory, etc.) having stored thereon executable instructions tangibly stored thereon that enable a processing device (e.g., a data manager) to execute examples of the methods disclosed herein.

[0125] The steps and/or operations in the flowcharts and drawings described herein are for purposes of example only. There may be many variations to these steps and/or operations without departing from the teachings of the present disclosure. For instance, the steps may be performed in a differing order, or steps may be added, deleted, or modified.

[0126] The coding of software for carrying out the above-described methods described is within the scope of a person of ordinary skill in the art having regard to the present disclosure. Machine-readable code executable by one or more processors of one or more respective devices to perform the above-described method may be stored in a machine-readable medium such as the memory of the data manager. The terms "software" and "firmware" are interchangeable within the present disclosure and comprise any computer program stored in memory for execution by a processor, comprising RAM memory, ROM memory, erasable programmable ROM (EPROM) memory, electrically EPROM (EEPROM) memory, and non-volatile RAM (NVRAM) memory. The above memory types are example only, and are thus not limiting as to the types of memory usable for storage of a computer program.

[0127] All values and sub-ranges within disclosed ranges are also disclosed. Also, although the systems, devices and processes disclosed and shown herein may comprise a

specific plurality of elements/components, the systems, devices and assemblies may be modified to comprise additional or fewer of such elements/components. For example, although any of the elements/components disclosed may be referenced as being singular, the embodiments disclosed herein may be modified to comprise a plurality of such elements/components. The subject matter described herein intends to cover and embrace all suitable changes in technology.

[0128] The term "processor" may comprise any programmable system comprising systems using micro- or nano-processors/controllers, reduced instruction set circuits (RISC), ASICs, logic circuits, and any other circuit or processor capable of executing the functions described herein. The term "database" may refer to either a body of data, a relational database management system (RDBMS), or to both. As used herein, a database may comprise any collection of data comprising hierarchical databases, relational databases, flat file databases, object-relational databases, object-oriented databases, and any other structured collection of records or data that is stored in a computer system. The above examples are example only, and thus are not intended to limit in any way the definition and/or meaning of the terms "processor" or "database".

[0129] The present disclosure includes figures showing designs in the form of user interfaces in which at least some of the elements are shown with boundary lines illustrated as solid lines. The use of solid or dotted (broken) lines is not intended to be limiting for the purpose of design patent protection or industrial design protection. The designs of the present disclosure are not intended to be limited to the illustrated embodiments in which some design elements are shown in solid boundary lines and other design elements may be shown in dotted lines. It is contemplated that boundary lines that are depicted in the enclosed drawings as solid lines may be disclaimed and replaced with broken boundary lines in some embodiments for the purpose of design patent protection or industrial design protection, and vice versa.

[0130] The present disclosure may be embodied in other specific forms without departing from the subject matter of the claims. The described example embodiments are to be considered in all respects as being only illustrative and not restrictive. The present disclosure intends to cover and embrace all suitable changes in technology. The scope of the present disclosure is, therefore, described by the appended claims rather than by the foregoing description. The scope of the claims should not be limited by the embodiments set forth in the examples, but should be given the broadest interpretation consistent with the description as a whole.

1. An automated device comprising:

a display screen;

a communication module for communication with a server;

a processor coupled to the display screen and to the communication module; and

a memory coupled to the processor, the memory having machine-executable instructions stored thereon, the instructions, when executed by the processor, causing the automated device to, during a session:

display, on the display screen, a data value selection interface for receiving a first input indicating a data value for requesting physical output from the automated device, and providing an option to confirm the data value;

directly in response to selection of the option to confirm the data value, display, on the display screen, a format selection interface providing an option to select a format of the physical output, and providing an option to confirm the format of the physical output;

directly in response to selection of the option to confirm the format of the physical output, transmit, via the communication module, a first signal to the server, the first signal including the data value received via the data value selection interface;

display, on the display screen, a data update processing interface providing output indicating processing of the request for the physical output;

directly in response to receipt of a second signal from the server, via the communication module, indicating that the data associated with an account has been updated with the data value, display, on the display screen, an acknowledgement interface indicating the account has been updated and indicating that the physical output has been provided, the acknowledgement interface further providing an option to end the session and an option to continue the session;

directly in response to selection of the option to end the session, display, on the display screen, a record preview interface providing a preview of a record of the session, the record preview interface further providing an option to generate output of the record.

2. The automated device of claim **1**, wherein the option to generate output of the record includes an option to transmit the output of the record to an email address linked to the account, wherein a third signal is received from the server, via the communication module, the third signal including the email address, and wherein the option to transmit the output of the record to the email address includes a preview of the email address.

3. The automated device of claim **1**, wherein the instructions further cause the automated device to:

directly in response the to the selection of an option on the record preview interface, display, on the display screen, a goodbye interface, the goodbye interface providing non-sensitive customer appreciation information specific to the account.

4. The automated device of claim **1**, wherein the data value selection interface provides a selectable option for requesting a pre-defined value, and wherein the first input is selection of the option for requesting the pre-defined value, which sets the data value of the first input to be the selected pre-defined value.

5. The automated device of claim **4**, wherein the selectable option for requesting a pre-defined value comprises a historically selected data value.

6. The automated device of claim **1**, wherein the format selection interface provides an option to select a default format of the physical output.

7. The automated device of claim **1**, wherein the instructions further cause the automated device to:

extract information from an access card inserted into the automated device;

transmit a fourth signal to the server, via the communication module, the fourth signal including the information extracted from the access card;

in response to receipt of a fifth signal from the server, via the communication module, the fifth signal providing information identifying the account associated with the access card, display, on the display screen, a welcome interface, the welcome interface providing at least some of the plurality of selectable options for performing an action related to the account;

directly in response to selection of one of the selectable options provided by the welcome interface, display, on the display screen, an authentication interface for inputting an authentication code for the account;

transmit a sixth signal to the server, via the communication module, the sixth signal including a second input received via the authentication interface; and

display, on the display screen, a authentication waiting interface, the authentication waiting interface providing output indicating processing of the authentication code for the account;

in response to receipt of a seventh signal from the server, via the communication module, the seventh signal providing information that the second input is validated for the account, display, on the display screen, an account selection interface, the account selection interface providing a selectable account option; and

in response to selection of the selectable account option, proceed to display the data value selection interface.

8. The automated device of claim **7**, wherein the instructions further cause the automated device to, when the option selected at the welcome interface is an option to request the physical output, display, on the display screen, the data value selection interface directly in response to selection of the selectable account option at the account selection interface, and wherein the account to be updated is associated with the selected account option.

9. The automated device of claim **7**, wherein the instructions further cause the automated device to, when the option selected at the welcome interface is an option to display more selectable options:

directly in response to selection of the selectable account option, display, on the display screen, an account information interface, the account information interface displaying information about an account associated with the selected account option, the account information interface providing selectable options for updating the account; and

directly in response to selection of the selectable options for updating the account, display, on the display screen, the data value selection interface.

10. The automated device of claim **7**, wherein the instructions further cause the automated device to:

directly in response to the selection, on the acknowledgement interface, of the option to continue the session, display, on the display screen, the account selection interface.

11. A method at an automated device, the method comprising:

displaying, during a session, a data value selection interface for receiving a first input indicating a data value for requesting physical output from the automated device, and providing an option to confirm the data value;

directly in response to selection of the option to confirm the data value, displaying a format selection interface providing an option to select a format of the physical output, and providing an option to confirm the format of the physical output;

directly in response to selection of the option to confirm the format of the physical output, transmitting a first signal to a server to update data associated with an account managed by the server, the first signal including the data value received via the data value selection interface;

displaying a data update processing interface providing output indicating processing of the physical output;

directly in response to receipt of a second signal from the server, indicating that the data associated with an account has been updated with the data value, displaying an acknowledgement interface indicating the account has been updated and indicating that the physical output has been provided, the acknowledgement interface further providing an option to end the session and an option to continue the session;

directly in response to selection of the option to end the session, displaying a record preview interface providing a preview of a record of the session, the record preview interface further providing an option to generate output of the record.

12. The method of claim **11**, wherein the option to generate output of the record includes an option to transmit the output of the record to an email address linked to the account, wherein a third signal is received from the server, the third signal including the email address, and wherein the option to transmit the output of the record to the email address includes a preview of the email address.

13. The method of claim **11**, further comprising:

directly in response to selection of an option on the record preview interface, displaying a goodbye interface, the goodbye interface providing non-sensitive customer appreciation information specific to the account.

14. The method of claim **11**, wherein the data value selection interface provides a selectable option for requesting a pre-defined value,

wherein the first input is selection of the option for requesting the pre-defined value, which sets the data value of the first input to be the selected pre-defined value.

15. The method of claim **14**, wherein the selectable option for requesting a pre-defined value comprises a historically selected data value.

16. The method of claim **11**, wherein the format selection interface provides an option to select a default format of the physical output.

17. The method of claim **11**, further comprising:

extracting information from an access card inserted into the automated device;

transmitting a fourth signal to the server, the fourth signal including the information extracted from the access card;

in response to receipt of a fifth signal from the server, the fifth signal providing information identifying the account associated with the access card, displaying a welcome interface, the welcome interface providing at least some of the plurality of selectable options for performing an action related to the account;

directly in response to selection of one of the selectable options provided by the welcome interface, displaying an authentication interface for inputting an authentication code for the account;

transmitting a sixth signal to the server, the sixth signal including a second input received via the authentication interface; and

displaying a authentication waiting interface, the authentication waiting interface providing output indicating processing of the authentication code for the account;

in response to receipt of a seventh signal from the server, the seventh signal providing information that the second input is validated for the account, displaying a account selection interface, the account selection interface providing a selectable account option; and

in response to the selection of the selectable account option, proceed to displaying the data value selection interface.

18. The method of claim **17**, further comprising:

when the option selected at the welcome interface is an option to request the physical output, displaying the data value selection interface directly in response to selection of the selectable account option at the account selection interface, and wherein the account to be updated is associated with the selected account option.

19. The method of claim **17**, further comprising:

when the option selected at the welcome interface is an option to display more selectable options, directly in response to selection of the selectable account option, displaying an account information interface, the account information interface displaying information about an account associated with the selected account option, the then interface providing selectable options for updating the account; and

directly in response to selection of an option for updating the account, displaying the data value selection interface.

20. A non-transitory machine-readable medium having tangibly stored thereon executable instructions for execution by a processor of an automated device, wherein the instructions, when executed by the processor, cause the automated device to, during a session:

display, on a display screen of the automated device, a data value selection interface for receiving a first input indicating a data value for requesting physical output from the automated device, and providing an option to confirm the data value;

directly in response to selection of the option to confirm the data value, display, on the display screen, a format selection interface providing an option to select a format of the physical output, and providing an option to confirm the format of the physical output;

directly in response to selection of the option to confirm the format of the physical output, a first signal to a server to update data associated with an account managed by the server, the first signal including the data value received via the data value selection interface;

display, on the display screen, a data update processing interface providing output indicating processing of the physical output;

directly in response to receipt of a second signal from the server, via a communication module, indicating that the data associated with an account has been updated with the first input data, display, on the display screen, an acknowledgement interface indicating the account has been updated and indicating that the physical output has been provided, the acknowledgement interface further providing an option to end the session and an option to continue the session;

directly in response to selection of the option to end the session, display, on the display screen, a record preview interface providing a preview of a record of the session, the record preview interface further providing an option to generate output of the record.

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